



FRIDAY, DECEMBER 23.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Rome, Watertown & Ogdensburg.

Elections.—Buffalo, Rochester & Pittsburgh, George W. Bartlett, General Superintendent.—East Tennessee, Virginia & Georgia, C. H. Hudson, General Manager.—Housatonic, Wm. H. Starbuck, President.—Lake Shore & Michigan Southern, Joseph O. Osgood, Chief Engineer.—New Lisbon, East Liverpool & Southern, Daniel Crawford, President.—Richmond & Danville, George S. Scott, President.—Toledo & Michigan Belt, S. C. Reynolds, President.

New Companies Organized.—Beloit & Nebraska files a charter in Kansas.—Chicago & New Orleans files articles in Illinois.—Canaveral & South Florida is chartered in Florida.—Milwaukee & Geneva files articles in Wisconsin.—Toledo & Michigan Belt is incorporated in Ohio.—Evansville, Terre Haute & Indianapolis filed articles in Indiana.

Changes and Extensions.—Colorado: Colorado Midland completed to Glenwood Springs.—Dakota: Illinois Central is completed to Sioux Falls.—Illinois: Chicago, St. Louis & Paducah is completed from Marion to near New Burnside.—Chicago & Eastern Illinois will be extended to St. Louis next year.—Kansas: Chicago, Kansas & Nebraska extended to Phillipsburg.—Mississippi: Mobile & Northwestern is to be changed to standard gauge.—Montana: Helena, Boulder Valley & Butte is extended 13 miles.—North Carolina: Wilmington, Chadbourn & Conway opened from Chadbourn to Conway, S. C.—Oregon: California & Oregon is completed.

Traffic.—Anthracite coal shipments for the week ending Dec. 17 show an increase of 13.4 per cent., as compared with the same period last year; bituminous shipments show an increase of 49.5 per cent. Cotton receipts, interior markets, for the week ending Dec. 16 show an increase of 6.8 per cent., as compared with the corresponding week last year; shipments show an increase of 23.0 per cent.; seaport receipts show an increase of 47.9 per cent.; exports an increase of 16.9 per cent.; cotton in sight is greater than at the same date last year by 9.5 per cent.

Earnings.—Fifteen roads report gross earnings for the month of November, 5 showing a decrease and 10 an increase; the net increase is \$172,594, or 5.6 per cent. For the month of October, 12 roads report gross and net earnings, 3 showing a decrease in net; the net increase is \$384,832, or 8.7 per cent. For the 11 months ending Nov. 30, 95 roads report gross earnings, 4 having an increase; the total net increase is \$35,654,389, or 14.4 per cent.

Miscellaneous.—Central of Georgia has bought the Savannah, Dublin & Western.—Indianapolis Decatur & Springfield perfects reorganization.

Contributions.

The Continuous Heating Coupling Committee.

NEW YORK, Dec. 21, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I consider the patience exhibited by the members of the committee on the investigation of couplers for continuous steam heating, held at the Astor House yesterday, as admirable in the extreme; but I do not think that, under the circumstances, full justice was done in the exhibit of any or all of the couplers before them. When one man, with the gift of eloquence, gets advantage of a distinct hearing over all the others, and uses that hearing to denounce all and every coupler except his own, I think the Executive Committee will place that man's conduct in the position which it deserves. There were many couplers there with merits fully equal to the one referred to, if not very much superior, and I consider his fling at the Martin failure as equal to the action of the ass kicking the dead lion. In a matter of this kind it is almost impossible for even mechanics, as most of these gentlemen are, to tell wherein the advantages of one coupler presented would be over another without thorough practical tests. I trust the conclusion that the committee will arrive at will be only reached after that has been done and a fair show given to all who choose to present their couplers for experiment and proof. STEAM COUPLER.

The Howe Truss Car Frame.

NEW YORK, Dec. 12, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see in your issue of Nov. 4 an illustration of a method of framing or bracing the sides of freight cars, which you call with reason the perfect plan, and which you attribute to Mr. J. W. Cloud.

In order that the record may be correct, I beg to say that I both proposed and applied this method in 1880 on the Pan Handle. After trying it in actual service I urged its adoption without success.

Mr. Cloud's application for patent on this construction is dated May 5, 1884.

A. K. MANSFIELD.

Fall of a Retaining Wall.

Thursday, the 15th inst., about 40 feet of the retaining wall on the north side of the New York, New Haven & Hartford tracks at Portchester fell out, covering the north track with a mass of masonry and earth. All traffic on that track was interrupted nearly 24 hours. Fortunately no train accident resulted, although fast trains are run there at short intervals, and the wall fell without any warning.

The wall was built to retain the street on the north side of the tracks, and was commenced about the middle of November and completed about the first of December. The wall was cement rubble work, height 18 ft., width on top 3 ft. and on the bottom 8 ft., having a batter on the face of 1 in. to 1 ft. The filling in of the rear of the wall was carried up at the same time as the wall to the full height of the new grade in the rear, and to a width on top of twenty feet. The slope of the ground in the rear of this wall ascends very rapidly, but just in the rear of the portion which fell there is a low place or pocket, into which the water from the side hill drains. A drain was made through the wall for the purpose of carrying away the water, but from sheer neglect it was stopped up in the rear, so that when the water came down to this low place there was no escape, and the wall for 35 or 40 ft. in length was pressed out at the bottom some 3 ft. above the foundation, giving no warning and having shown no signs of being out of batter or line, although about a week previous the wall adjoining this, about 10 feet west of the abutment for William street bridge, had showed about 2 inches out of batter.

There is no doubt that the wall was not properly tied or thoroughly filled with mortar, and that proper care was not taken to secure drainage, although the drain was the full size, according to plan.

Freight Train Brakes in the New England Railroad Club.

We gave last week a brief abstract of the proceedings of the New England Railroad Club at the regular meeting Dec. 14. Additional particulars are now available. The subject for the evening's discussion was automatic freight brakes, and Mr. Lauder, who had been appointed at the last meeting to open the discussion, read the following paper:

AUTOMATIC BRAKES FOR FREIGHT TRAINS.

The recent exhibition given by the Westinghouse Air Brake Co. of their automatic freight train brake on the Fitchburg Railroad, near this city, has given the subject we have before us for discussion to-night new interest, and I know of no subject that possesses more interest, or is of more importance to the railroad, viewed from an economic standpoint, than this one at this time.

The safe working of trains is, of course, of the first importance, and their economical working comes next. The public do not have so much interest in the safe movement of freight trains as of passenger, except as regards the safety of trainmen, but their safety is of paramount importance and anything that will diminish the liability to accident ought to be and will be adopted by the railroads of the country. By reference to the accident statistics published by the *Railroad Gazette*, I find that in the month of September, 1887, there was a total of 150 accidents on the railroads throughout the country, in which 61 persons were killed and 191 injured. Of this number of accidents, 83 were collisions, six being caused by trains breaking in two. The exhibition referred to in the beginning of this paper made it plain that collisions caused by trains breaking apart could not occur if the cars were equipped with continuous automatic brakes. It is also certain that collisions from other causes would be largely reduced, if not entirely prevented, if all trains were so equipped. Derailments caused by broken wheels, or other parts of the rolling stock, by broken rails, misplaced switches, in fact from any cause, would have their destructive effects largely reduced by the application of automatic brakes.

The railroads of this country have gone on from year to year perfecting their permanent way, rolling stock, signaling apparatus, and, in fact, their whole system of operation, until it is well nigh perfect, with the single exception of methods of stopping freight trains. Here there has been no improvement, and to-day the same crude methods are in use that were 40 years ago. I think, gentlemen, you will bear me out in the statement that freight cars to-day are in process of construction with brakes applied to only four of the eight wheels under them, and probably at the present time at least one-half of the freight cars of the country have brakes on only one-half of their wheels. Automatic continuous brakes on freight cars have already made headway on roads west of Chicago, but on roads east of that point are used only on special trains. The reason for this is that the Western roads as a rule have long distances to run, and the bulk of their business is done in their own cars, while with the roads farther east the reverse is the case, the roads being shorter and a larger amount of their business being done in the cars of other roads. The difficulty of adapting this latter condition of things to the use of continuous brakes has deterred many roads from equipping their cars which are fully alive to its advantages. It is gratifying, however, to see that progress is being made. The New York Central is reported as having decided to equip 500 stock cars, now under construction, with the automatic brake. The Fitchburg is also applying the same to 50 cars, while the Old Colony has had them in successful use on one train for the last three years. The cost of applying the Westinghouse automatic brake to freight cars has in the past stood in the way of its introduction, but the saving it would make in almost entirely preventing collisions and in mitigating the destruction of property in other classes of accidents would, I firmly believe, in a few years time more than meet the cost of its application and maintenance. The cost of maintenance of automatic brakes on freight cars, and the difficulty of keeping them in perfect order in rough and tumble service has deterred many of us from advocating their use, but several years of observation of their working has convinced the writer that this objection is more fancied than real, and that practically the expense of maintenance is narrowed down to occasionally a new coupling hose. The cost of the brake and application to new cars which have double brakes—and all cars ought to have them—is not over \$55.

What the automatic continuous brake has done for passenger traffic is well known. It has revolutionized the conduct of this traffic and made it possible to run trains at high speed and very close together. I estimate the number of passenger trains running daily in and out of Boston on the various roads centering here as upwards of 900. This is exclusive of trains on the Boston, Revere Beach & Lynn (narrow gauge). At certain hours all of the Boston roads have trains running

within two or three minutes of each other, and the safety and regularity with which this enormous traffic is conducted is largely due to the efficient brake with which the trains are equipped. The equipment of our freight trains with an equally efficient brake would, I think, produce economic results that would astonish us, both in the increased speed with which our trains could be safely run and the decreased expense of repairs to rolling stock.

The exhibition given by the Westinghouse Co. has created widespread interest among railroad men to know by what means such results were produced, and at the writer's request that company has sent us one of the new triple valves, cut in sections, so as to show the internal mechanism which plays such an important part in the application of this brake. The brake trials at Burlington, Iowa, last year, conducted under the auspices of the Master Car-Builders' Association, made it plain that there were serious defects in the Westinghouse automatic brake when applied to long freight trains. Those defects were found to be mechanical, and apparently they have been entirely overcome, and we now have a freight train brake which seems to be perfect in its operation. Bearing this fact in mind, let us all "put our hands to the plow" and make an effort to get the New England roads to make a beginning and push forward this matter until continuous brakes on freight trains are as universal as they now are on passenger. Safety and economy are the two great elements we should keep in mind while striving to make our railroads the best in the world.

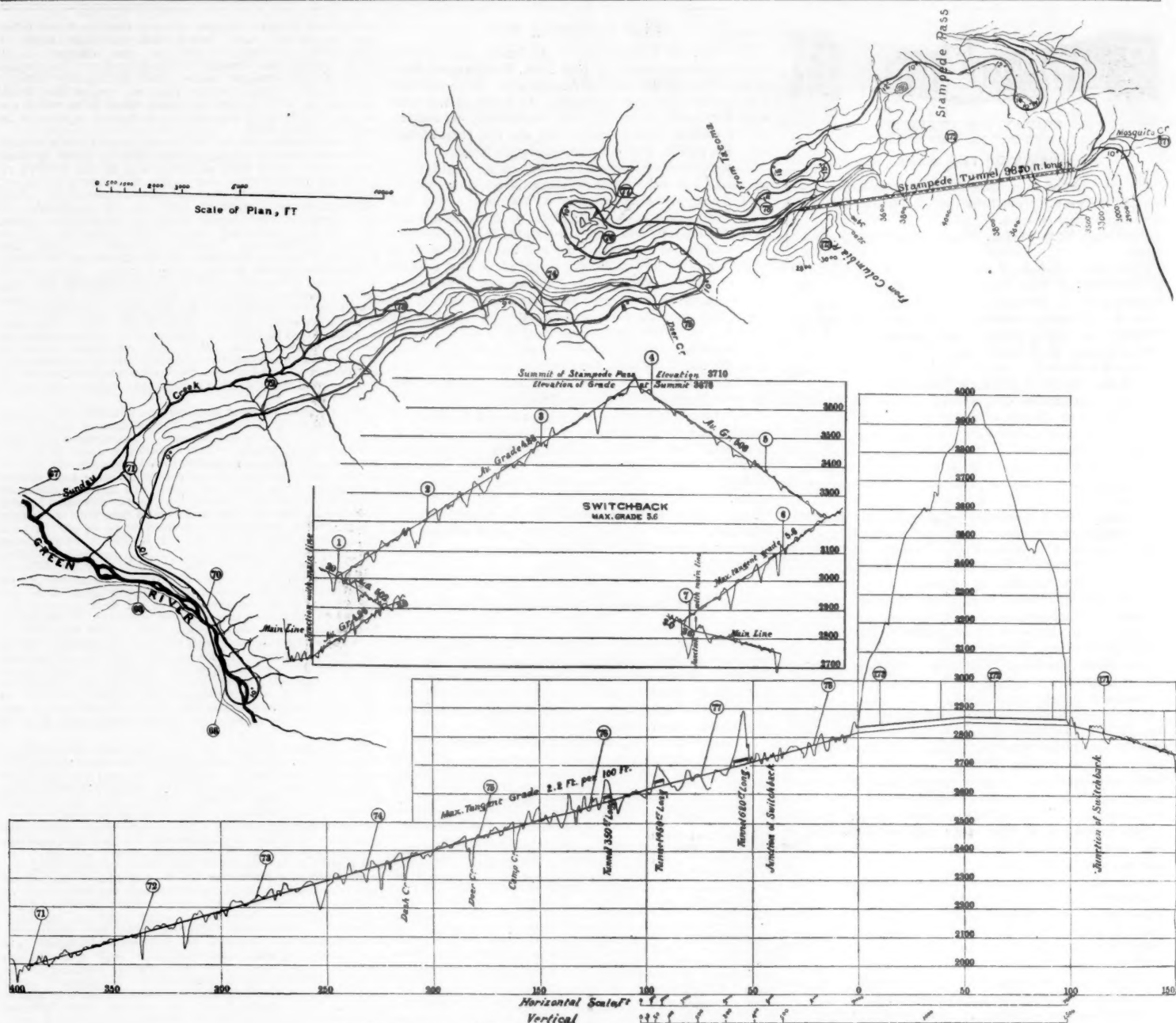
Mr. MARDEN: I think any one who witnessed the trial of the Westinghouse brake on the Fitchburg road recently will say that a continuous freight train brake is one of the necessities of freight trains. The remarkable stops that were made during those experiments proved conclusively that if our freight trains were all equipped with some good continuous freight train brake, one which was uniform, accidents would be diminished, and as has been said by President Lauder in his paper, that we could make better time with our freight trains, and we should keep one-third more of our cars out of our shops than we do now. I believe it would lessen the expense of repairs one-third to one-half. I think there can be no question that it would pay the different roads to equip, as fast as possible, all their freight trains with a continuous freight train brake. I have believed this for a number of years and advocated it. I have orders to furnish all our new freight equipment with the Westinghouse freight train brake, and we will undoubtedly have five or six hundred cars supplied with it on the Fitchburg road by the first of July next; at least we hope to. If we can put even five or ten cars thus equipped at the head of each train, I think we shall see a great benefit from it; and I hope the time will soon come when all our freight cars will be equipped in this way, making it safer to handle trains, and enabling them to make much quicker time than they do now.

Mr. ADAMS: I think in the recent trial of the Westinghouse brake on the Fitchburg road the most remarkable stops were made that I ever saw. It beat the passenger brake altogether; in fact, I think Mr. Westinghouse has beaten himself in the invention; but I trust that we shall not become so enthusiastic over it as to lose sight of the facts as they exist. While a large percentage of the cars that run west of the Mississippi and the Rocky Mountains are equipped with the Westinghouse brake, necessarily so, and could not do without it—the trains running long distances without applying the brake, and almost entirely on their own roads—it is quite different on the roads east of Buffalo, or even east of Chicago, which have not those advantages, where there are so many junctions, so many different roads and different railroad companies, whose interests, although in one sense identical, are in another separate and distinct; and when trains start east from Chicago, they are constantly breaking up and shifting. The impression seems to be in the minds of some that if we adopt the Westinghouse brake we shall be almost perfect. If the roads all over the country were equipped with it it would be a great advantage. If you have a train of 20 cars, and the five nearest the engine are equipped with the Westinghouse brake, if you break off the second car from the engine, you might stop the rear part of the train with those so equipped still attached to it; but if you break off the tenth car you would not stop it at all and a rear collision would not be avoided by such an arrangement. It will be a long time before we have cars enough equipped with this brake to avoid this danger.

Mr. LAUDER: We don't suppose that the Westinghouse brake is going to stop all accidents, but there are various kinds of accidents occurring every day that the Westinghouse automatic brake will entirely prevent, especially accidents from breakaway collisions, which are very frequent. This liability of the train to break apart is great for several reasons: Our trains are growing longer and heavier, and we have old cars mixed in with better ones, cars with weak draw-gear, which conduce to such accidents, and the liability of trains to break apart is greater than ever before, and the best managed roads are not exempt from it. The Old Colony road had an accident of this kind yesterday, and one poor fellow is in the hospital in consequence; and such accidents are occurring every day somewhere. We recently had a collision on the Fitchburg road, the result of which would have been very disastrous had the cars not been equipped with a continuous brake; as it was, not a passenger was injured. Now the only way to bring about the state of things we desire is to commence, and after we have got a start the movement will go forward rapidly.

Mr. ADAMS: I hope nobody will get the idea that I have the slightest desire to oppose the Westinghouse brake, or throw cold water on it. I think the railroad officers of New England are strongly in favor of it; but I don't think it is going into use so fast as anticipated by some, when we consider the number of cars it will have to be applied to. If it should be applied to all the new cars that are built during the next year there should be a large number in use in a short time; but we must remember that there are a great many cars in the United States, and the chances are that the rear collisions we speak of will be poorly provided for for a good many years to come. We don't want to flatter ourselves that we are going to get the full advantage of this brake all at once. One advantage not mentioned would be that we should keep the best cars next the engine, those with the best draw gear; the old cars being at the rear, if they dropped off they would surely go to destruction.

Mr. TURNER: * * * In regard to preventing rear collisions it is not necessary to have a continuous brake to do it. It can be done as well with an independent brake. Whether I shall ever be able to show the railroad public that an independent brake is the best brake for freight trains remains to be seen, but I know that the rear portion of a train can be stopped as well by it as by the Westinghouse. By putting a few cars at the front end of the train fitted with the Westinghouse brake, I can see there would be many advantages gained; but there would be one disadvantage, and that is that by using a brake that takes effect so quickly you would get a terrible shock at the rear end. I think the Master Car-Builders' Association deserves some credit for the production of the brake which Westinghouse has now produced, for after he and other



STAMPEDE PASS, CASCADE DIVISION, NORTHERN PACIFIC RAILROAD.

Plan and Profiles of Main Line, Tunnel and Switchback.

Datum of Levels—Mean Sea Level at Tacoma.

Zero of Miles—Tacoma, and West Bank of Columbia River.

brake companies had been advertising for years that they had an efficient brake for freight trains, a test was arranged for at Burlington through the influence of that Association, and there they proved that they didn't have any such thing as they thought they had, and so they had to make a further effort, which resulted in the present brake. We have not been long in the field, and have not advertised our brake at all. We tested it on our road yesterday, by which we showed that we had power at least, and that was not shown in regard to any independent brake at Burlington. What we may be able to show later on I will not say now, but we think we shall be able to give you a satisfactory independent brake if you want it.

LIFE OF FREIGHT CARS.

In answer to the question, what is the age of a freight car? Mr. Adams said that a gentleman had remarked that he saw some freight cars on the Old Colony or Boston & Providence marked with a certain number, followed by the letters B. C.

Mr. LAUDER: A prominent superintendent of motive power, who has charge of the car department as well as the locomotives on a large Western road, told me that he never allowed a car to run after it was eleven years old. In the West, I think, as a rule, when a car gets a little wrong, wants a new roof and ceiling, it is thrown away. I don't know how it may be in the Middle States, but in New England it is entirely different, and as a rule a car there is supposed to run for all time. When a car gets to that condition that it requires more money to repair it than it is worth after it is repaired, it is a good time to knock it down. On our road we are knocking down a good many cars built 30, 35 and even 45 years ago.

Mr. WEBBER: Mr. Lauder is right in his statement about the Western roads. The C., B. & Q. road used to condemn a good many cars that apparently might have been resurrected. I think their rule was that when a car was so badly damaged that the repairs would cost two-thirds of the value of the new car at that time, the car was torn down. The Western roads will scrap a car much sooner than the Eastern roads; though in case a car is badly smashed in an accident, it would be taken to pieces, and such parts as were standard, and could be straightened without too much expenditure of labor, as far as the iron work was concerned, would be laid aside for use in building new cars.

Mr. MARDEN: I think there is no doubt that in many instances in the case of Eastern cars they have been repaired when they should have been torn down. There is a tendency to build 34-ft. box cars, and there are times when it would really pay to throw away a 28-ft. box car, which, when it was built some years before, was built with light draw attachments, and will not stand the strain required of it now without frequent repairs. I think the matter of condemning

rolling stock should be left to the heads of the mechanical departments, for them to say whether it is more economical to tear a car down or rebuild it, and all the questions bearing upon the use of that car should be taken into consideration in forming a judgment. I think the Fitchburg road has torn down 204 cars during the past year, which indicates that there is not so much patching up of old cars as formerly. In other words, we are putting cars of standard length and capacity in place of those of lighter tonnage when they need repairs to such an extent as will warrant it.

Mr. ADAMS: One thing greatly in favor of the Westinghouse brake is the fact there is no other brake competing with it, and I have no doubt at all that it is going into general use.

Mr. WEBBER: While Mr. Adams is right in saying that there is no other brake than the Westinghouse to-day, it will not be so very long. At the Burlington test some other very good brakes were shown. I don't think that any freight train brake that uses electricity as an auxiliary in making a quick stop is going to be a success, on account of the general unreliability of electricity so applied and the cost of keeping the apparatus in repair.

The CHAIRMAN: I don't think any one who has used electricity would advocate its application to freight train brakes. It is far too delicate for such use, on account of the difficulty of keeping the appliances in order.

Mr. SHINN: I don't think the universal use of the new brake need depend wholly upon the age of the freight cars. When any first class road gets half its cars equipped, it will find the difficulty of getting its cars adjusted in the train a great inducement to equip the rest of them; and if after some of the leading roads are well provided with this brake, they will refuse to receive the cars of roads not so equipped. I think the time will be very materially reduced below the maximum age of the car, when all the cars of the country may be so equipped, probably to a period not over seven or eight years.

UNIFORM COUPLINGS FOR HEATING.

A report was made by the committee which met at Buffalo, in conference with committees of other clubs, to consider the matter of uniform coupling for continuous heating systems. The report stated that a resolution was adopted to the effect that a flexible coupler was desirable for a steam coupling between passenger cars. It was then decided, after some discussion, that the committees report back to their several clubs what had been done, and advise that the clubs recommend to the different roads that representatives be sent to a meeting which will be called at some place, probably New York, by a committee of representatives of different roads, which met in New York previous to this meeting in Buffalo. It was thought that action taken by a body so composed would perhaps be better than by the representatives of the

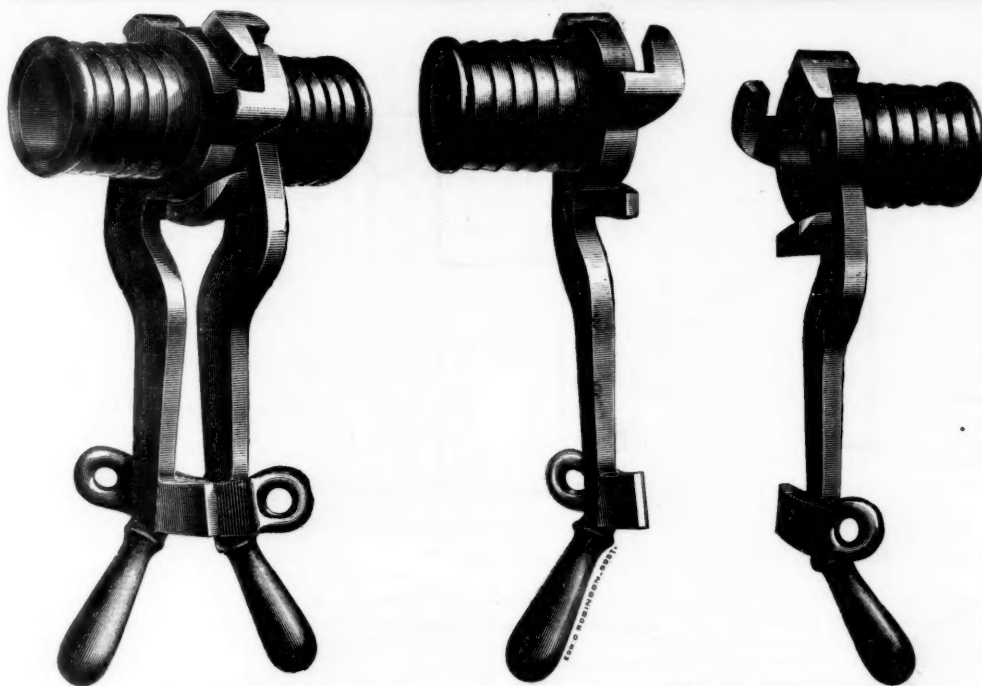
clubs in the matter in question. So that it is now left for the larger meeting to decide, if possible, what the universal coupler shall be.

The President suggested that it would be proper now for the New England Club to take up this matter and, as far as the New England railroads are concerned, adopt the recommendations of the Buffalo assemblage, and issue a circular asking the railroads to appoint their representatives, to meet either as a New England convention, or with representatives from other roads, provided other clubs take the same action; and he moved that the officers of the New England Railroad Club be instructed to prepare a circular, to be submitted to the various railroads of New England, asking each of them to appoint a representative to meet with others in national convention for the purpose of selecting a standard coupling for steam connections between passenger cars, such convention to meet at the call of the committee appointed at the November meeting in New York. He thought the roads would join in such a plan, merely for the purpose of looking into the matter and ascertaining if it is possible to settle on a uniform coupler.

Mr. Adams seconded Mr. Lauder's motion, and agreed with him that it is better to put this matter into the hands of the railroads themselves rather than to have it attempted by the clubs. The movement already made in this direction was very judicious and proper. A few leading railroad men met voluntarily or by self-appointment in New York last month and discussed this matter and set the ball in motion. It was resolved at that meeting to take some action by which the matter could be brought into the hands of the railroad officials. He said further that while we have not yet had experience enough to decide intelligently what may be the best manner of coupling cars for steam heat, absolutely, the general impression seems to be in favor of a flexible coupling. It is important to come to some agreement in this matter, as almost everybody is now ready to admit that steam heat is the coming heat for trains; and if it is to be generally adopted, it is, of course, necessary to have as uniform a method of coupling the cars as possible. We can as well begin right as to begin wrong. Mr. Lauder's motion was adopted.

Stampede Pass Switchback and Tunnel.

We give herewith a plan and profiles of the switchback, and of a portion of the adjacent main line of the Cascade Division of the Northern Pacific Railroad, over the Cascade Mountains, by the Stampede Pass. The Cascade Division leaves the main line of the Northern Pacific at Pasco, just east of the Columbia River, follows up the valley of the



Coupled

Uncoupled.

THE CURTIS COUPLING FOR CONTINUOUS STEAM HEATING.

Yakima River and crosses the Cascade Range at a point where the elevation is 3,710 ft. above the sea. From the summit to Tacoma is about 80 miles. From the west bank of the Columbia River to Tacoma is about 252 miles.

The switchback line was constructed to connect the line through, during the piercing of the Stampede tunnel. It was begun in August, 1886, and finished June 1, 1887. The total length of the switchback is 7.04 miles. It leaves the main line on the east side at an elevation of 2,877 ft., crosses the summit at 3,678 ft., and rejoins the main line at an elevation of 2,731. The total rise on the east side is 801 ft. in 3.24 miles, or 247.2 ft. per mile. On the west the rise is 947 ft. in 3.8 miles, or 249.2 ft. per mile. The maximum tangent grade is 5.6 per cent., or 295.68 ft. per mile. The grades in detail are:

	Miles.
90 to 100 ft. per mile	0.035
240 to 250 "	1.415
250 to 300 "	1.390
260 to 270 "	0.490
270 to 280 "	2.180
280 to 290 "	0.120
295.68 "	1.180
Level	0.230

Total..... 7.040

The grades of the stems at the switches are 3 per cent.

The curves of different degrees are, in feet and total curvature, as follows:

Degree of curves.	Total feet.	Total curvature.
6°	617.7	37° 04'
7°	234.6	16° 25'
8° and 8° 30'	2,102.0	175° 12'
10°	3,818.9	381° 53'
12°	4,465.9	535° 44'
14°	5,326.7	745° 44'
15°	2,883.3	447° 30'
Tangent	17,609.9	

Total..... 37,159.0
Curvature to the right, 1,185° 57'; to the left, 1,153° 35'; extreme single curves, 248° 40', 213° 35', 198° 50'.

The two stems on the east side are each 595 ft. long, and the two on the west are 585 and 599 ft. respectively, or 2,304 ft. in all. On the summit are a siding of 1,286 ft. and a cut off of 571 ft. There are 32 trestle bridges, aggregating 7,525 lineal ft. Of these the longest are 720 ft., 560 ft., and four of from 420 to 480 ft. There are seven trestles over 40 ft. high, the highest being 125 ft., and others 75, 80 and 90 ft., respectively. There are 15 snow-sheds, aggregating 3,364 lineal ft. Telephone stations are established at each stem and at the summit.

Four and five rails are laid on 1,354 ft. of the sharpest curves, to carry the tread of the driving wheels of the "decapods," and heavy consolidation engines.

The switchback is operated by two "Decapod" engines, each with 10 coupled drivers and a two-wheeled truck, and by several Consolidation engines. The Decapod engines are the largest in the United States, the total weight on drivers and truck being 148,000 lbs. They were built by the Baldwin Locomotive Works. They were designed for working on curves of 330 ft. radius. The first, fourth and fifth pairs of driving-wheels have flanges; the second and third pairs are without flanges. To reduce the friction of passing curves, the rear driving-wheels have additional play. That is, the first and fourth pairs of drivers have $\frac{3}{4}$ of an in. play, and the fifth has 1 inch. The rigid wheel-base is, therefore, practically only the distance between centres of the first and fourth driving-wheels, namely, 12 ft. 8 in., which is less than that of either a Consolidation or Mogul locomotive of ordinary type. The estimated tractive power, in tons of 2,240 lbs., of cars and lading, on level track, and on straight grades of from 1 to 4 per cent., track and cars being in good condition, is as follows:

Level.	1 per cent.	2 per cent.	3 per cent.	4 per cent.
3,600	970	500	320	220

It is of interest to compare some of their dimensions

with those of El Gobernador, built in the Sacramento shops of the Central Pacific, and illustrated in the *Railroad Gazette*, page 52, 1884, and with those of the Decapod built by the Baldwin Works for Brazil, which was shown in the *Railroad Gazette*, page 274, 1885. These latter engines were also described and illustrated in the last edition of "Recent Locomotives."

	North Pacific Decapod.	Brazilian Decapod.	El Gobernador.
Drivers coupled	10	10	10
Truck wheels	2	2	4
Driving wheel-base	17' 0"	16' 11 1/2"	19' 7"
Rigid wheel-base	12' 8"	24' 0 1/2"	28' 11"
Total	24' 4"	138,000	121,600
Weight on drivers (lbs.)	133,000	128,000	121,600
Weight on trucks	15,000	16,000	32,400
Cylinders	22" x 26"	22" x 26"	21" x 38"
Diameter drivers	45"	45"	57"

The weight in working order of locomotive and tender is about 228,000 lbs.

Last January Mr. G. W. Cushing, then Superintendent of Motive Power, Northern Pacific Railroad, wrote to Burnham, Parry & Williams that the Decapods went "anywhere, either on bad track or curves, that an eight-wheeled engine could go."

In both gradients and curves the Stampede switchback is one of the most difficult lines operated in the world. So far as we know the only line which surpasses it in both features is the Iron Mountain Branch of the Denver & Rio Grande from Hecla to Calumet, 6.8 miles. The following table of grades and curves on some of the most remarkable lines of the world is compiled from the *Railroad Gazette* of Aug. 28, 1885:

	Max. grade. Per cent.	Max. curve. Degree.
Stampede Switchback	5.6	15°
Iron Mine Branch, D. & R. G.	8.0	25°
Marshall Pass	4.0	24°
Orizaba (Peru)	4.0	14° 30'
Mexican Ry.	4.0	17° 40'
Mexican National	3.8	15°
Southern Pacific	2.2	10°
Central	2.0	10°
St. Gothard	2.7	
Brenner Pass	2.5	

The Stampede tunnel now building is 9,850 ft. long. The elevation of the east portal is 2,845 ft., and that of the west portal is 2,818 ft. The centre elevation is 2,855 ft. The grade up from the east portal is 0.2 per cent., and from the west portal 0.74 per cent. to the summit of grade in the tunnel. The datum of levels is mean sea level at Tacoma, as established by the United States Coast Survey. From the official progress report it appears that on Nov. 30 last the total heading driven was 7,255 ft., and the average progress per day is about 16 ft. Its completion may therefore be expected early next summer.

The Curtis Coupling for Continuous Steam Heating.

The accompanying illustrations represent a form of pipe coupling recently introduced by the Curtis Regulator Co., of Boston. It is especially for use in connection with any continuous system of heating cars with steam from the locomotive.

The inventors state that the requirements of a perfect coupling for heating pipes in cars are as follows:

1st. Each coupling must be complete in itself, so that any pair taken at random from a hundred will lock perfectly tight, and be just alike in every particular.

2d. Each pair should be so connected that, when in position and locked together, they will automatically unlock when the cars are detached from one another.

3d. The couplings should be light, and so constructed that they can be handled comfortably when hot, and can be instantly connected and disconnected by hand.

The Curtis coupling consists of the ordinary nipple for

rubber hose, with a suitably packed joint, and three strong lugs or clamps to draw the faces together. The locking faces of the clamps are set at a slight angle with the face of the coupling, so that when turned in opposite directions by the levers the packed surfaces are drawn firmly together, making a steam-tight joint. Each coupling has a lever or handle, and each handle has a fluted surface set at right angles to the axis of the coupling, and so adjusted in relation to the face of the coupling that when two couplings are clamped together the fluted surfaces engage with one another, forming a locking device which holds the two couplings firmly engaged. On each lever is an eye, to which is connected a chain. The chain on each lever is fastened at the other end to the platform of its car, and, being shorter than the connecting hose, draws the fluted surfaces past one another and disconnects the coupling before strain comes upon the hose.

It is obvious that these couplings can be handled with comfort, even when hot, by means of the projecting handles which hold the hot coupling at a distance, while a sharp pull in opposite directions connects or disconnects them instantly. The projecting clamps form a complete protection to the face of the coupling against abrasion from outside objects.

Continuous Steam Heating Couplers.

A meeting of the committee on continuous steam car heating took place at the Astor House in New York City on Dec. 20. Mr. G. W. Cushing (Philadelphia & Reading) presided, and there were also present Mr. W. Forsyth (Chicago, Burlington & Quincy), Mr. John W. Cloud (New York, Lake Erie & Western), Mr. H. Stanley Goodwin and Mr. Kinsey (Lehigh Valley), Mr. R. C. Blackall (Delaware & Hudson Canal Co.), Mr. Frye and Mr. Martin (Pullman Palace Car Co.), Mr. Rogers (New York Central), Mr. Leighton and Mr. M. N. Forney. Among the representatives of various systems of steam heating were Messrs. Wilder, Gunnison and Benjamin, of the Safety Car Heating Co.; Messrs. M'Elroy and Edwards, of the M'Elroy Steam Heating & Lighting Co.; Mr. Mignaux, Mr. Edward E. Gold, Mr. D. D. Sewall, Mr. Dunham, Mr. Pearson and Mr. T. D. Van Devort.

After the committee had consulted together in private for some time, the inventors of the different systems of steam heating were admitted, one by one, and explained their systems of heating and method of coupling, the construction of the couplers being especially dwelt upon.

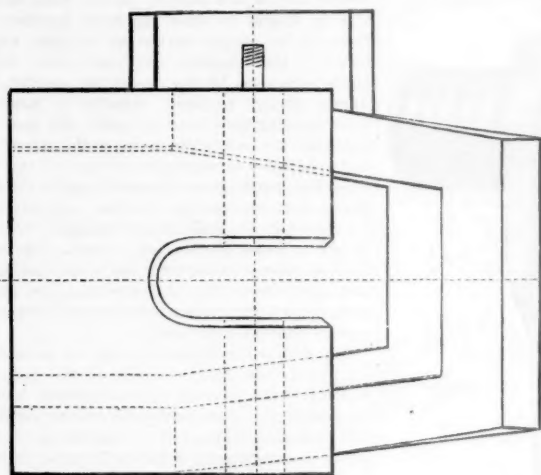
Mr. M'ELROY showed his appliance for enabling the Baker heater system to be worked with steam from the engine. This system is new and has just been fitted to the directors' car on the Delaware & Hudson. It consists of a pear-shaped vessel of cast iron inserted in the circulating pipe of the Baker system. A jet of steam is introduced by means of a perforated pipe, and forces its way through a mass of gravel, which will pass through a mesh of 3 to the inch, but will not pass through a mesh of 4 to the inch. The object of the gravel is to destroy noise, which appears to be effectually accomplished. A circulation is rapidly set up in the pipes of the Baker system, and the water is completely heated in about 7 minutes. If the steam is turned on when the Baker pipes are empty, the steam condenses and fills the pipes with water in about an hour and twenty minutes, the car being kept warm while this process of condensation is going on. It is not proposed to use salt water with this system, as the mixture of condensed water would soon render it fresh. If the car has to stand any length of time the pipes would be emptied and the car would soon be warmed after the locomotive was attached. The coupling is a straight coupling, with two vulcanized gaskets butted together. Both couplings are exactly alike, and they are firmly clamped together by two revolving rings, furnished with handles, grooves on the rings bearing against cams or interrupted screw threads on the coupling. Any surplus water from the condensation of the steam is got rid of by a pipe from the circulating drum. The pipe leads downward and terminates in a Curtis trap beneath the car. When the water level in the circulating drum of the Baker heater rises above a certain level, it flows down this pipe and escapes at the trap. When the system starts, it is claimed that all the air is blown out by the steam, and the inventor states that his experience has shown that condensed water, free of air, will not freeze until the temperature falls to about 22 degrees Fahr. above zero. The price of the apparatus fitted to a car is \$175, complete with hose and coupling. It can be fitted in one day, and the pear-shaped vessel weighs about 50 lbs.

Mr. MIGNAUX then exhibited his metallic substitute for hose, which he stated had been used on the Manhattan Elevated, the Delaware & Hudson and many other roads for several seasons.

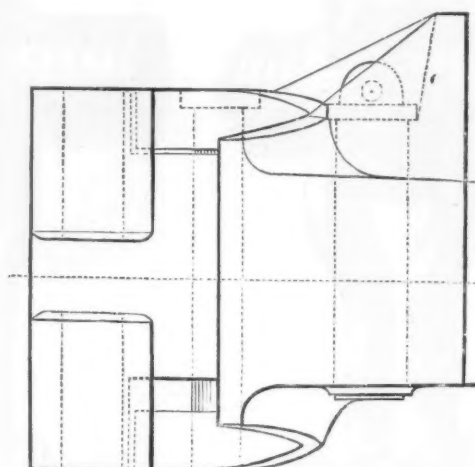
Mr. GOLD then explained his system of heating and coupling, which have been fully described and illustrated in the *Railroad Gazette*.

Mr. SEWALL then explained his coupling. In answer to questions he stated that the diameter of his pipe was $1\frac{1}{4}$ in., which seemed ample, and that in some experiments made with a train of 12 cars and a strong wind blowing, with the thermometer about zero, the train was heated very satisfactorily, and the heat in each car could be regulated independently. Mr. Lord was present at these experiments, on behalf of the Engineer of Tests of the Pennsylvania Railroad.

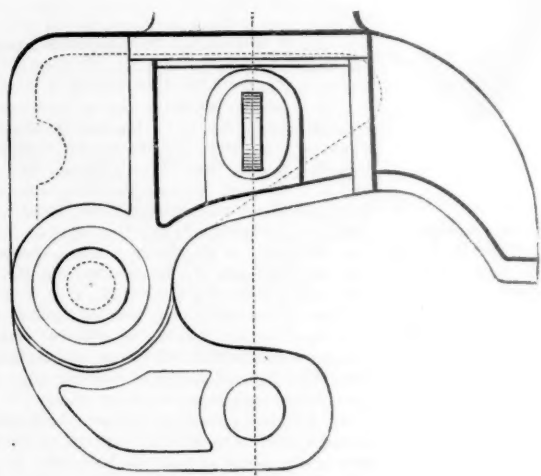
Mr. SEWALL stated that his coupling could be easily handled and was not too hot, as an air space existed and prevented any undue condensation. He claimed that his coupling was simple, having no spring or latch or other mechanical device likely to break or get out of order, and that the only portions exposed to wear were the locking lugs, and as these wore, the steam tight surfaces would simply be pressed more closely together. He believed that self-closing valves were



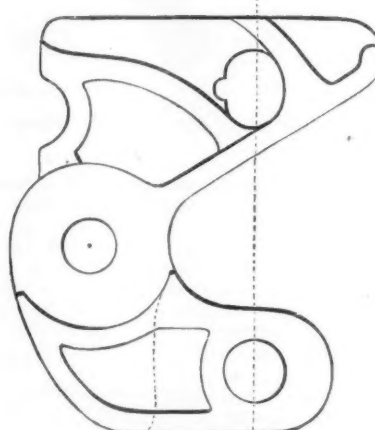
End Elevation.



Side Elevation.



Plan of Coupler.



Plan of Knuckle.



Locking Pin.

THE LORRAINE COUPLER.

unnecessary, as the steam should be allowed to escape as quickly as possible in the event of an accident, so as to avoid any possible injury to passengers. The coupling has been used on the Maine Central under very trying conditions for several winters, and all the cars on that road were being equipped with his system as fast as they came into the shops. He had received orders from 25 leading railroads, including the Chicago & Northwestern and the Chicago, Burlington & Quincy. His couplings were all alike and interchangeable. They were simple and durable; there was no wear on the surfaces making the joint, and an old one would couple efficiently with a new one and be perfectly tight.

Mr. DUNHAM then showed his coupling, which is a straight-line coupling, two female couplers being attached to the ends of hose and an intermediate double-ended male piece coupling with each of the female pieces. The joint is made with a metal face bearing against a small vulcanized rubber ring let into the metal. The couplings are simply forced together and pull apart without further attention when the train parts. Special provision is made for covering this coupling with a non-conducting composition, and preventing any radiation of heat. The outer surface of the coupling is made with ribs, forming pockets, which can be filled with lampblack or any suitable non-conductor, wrapped over with asbestos, cloth or canvas.

Mr. PEARSON then showed a drawing of a coupling which has been recently patented, and of which no model has yet been made.

Mr. F. M. WILDER then explained the system of heating used by the Safety Car Heating Co. This system has been fully illustrated and described in the *Railroad Gazette*. Mr. Wilder claimed that, as regards coupling, his system possessed many advantages over all others. As two lines of hose were used, the cars could still be heated even if one hose failed or the gasket was found to be defective. As the couplings were situated above the platforms, they could be coupled after the train started. The self-closing valve prevented any escape of steam should the couplings pull apart, and though the steam could not scald any one, as it escaped into the open air, it might be a source of annoyance to passengers. He understood that experience in Sweden, where they had used steam heating with rubber hose connections for some years, showed that a hose exposed only to the action of dry steam would last three times as long as a similar hose in which condensed water lodged. This was a strong argument in favor of their method of placing the hose above the platform, so that no water could possibly lodge in the coupling. In this they differed from every other system. He believed that their opening was of sufficient diameter. The two openings together were equal in area to $1\frac{1}{2}$ in. pipe. They had hitherto had no difficulty in keeping the cars warm, but had as yet had no experience with very cold weather. A train of six vestibule cars had run four

trips between New York and Chicago with their system. They had not yet used their method of injecting steam into the Baker system, except on the New York & New England. Where this system was used the water became fresh and the Baker system became an open circulating system, and the advantage attaching to the use of salt water was lost. He had found, by experiments made in moderate weather, the thermometer being about freezing, that seven minutes after attaching the engine to a train of cold cars the steam blowing out at the end of the train was sensibly dry, showing that no rapid condensation was going on and that the water in the Baker system was already appreciably heated. They used an ordinary expansion trap—a long brass rod in a cast-iron case, the difference in the amount of expansion between the brass and the cast iron serving to operate the trap. A trap on this principle had been adopted many years ago and was now public property.

Mr. PENNYCUIK exhibited his coupling, and explained its action. He stated, in reply to questions, that it was not yet fitted to any train. This coupling has been already illustrated in the *Railroad Gazette*.

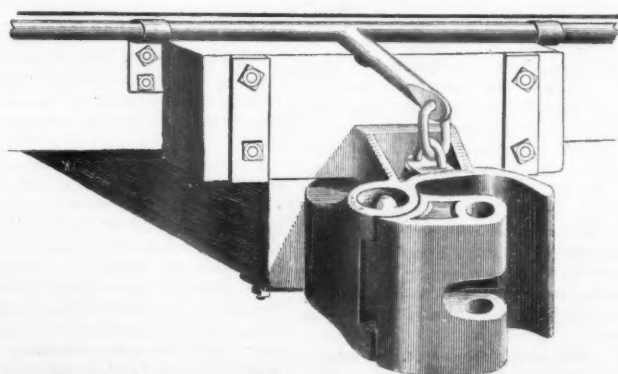
Some conversation then took place as to the necessity for a double line of pipe in connection with a vacuum pump on the engine. It was argued that it is difficult, if not impossible, to make a pump work with a mixture of steam and water. On the other hand, Mr. Mignaux stated that he had had considerable experience in heating buildings, and that he had found that in one building with 17,000 ft. of pipe, a pressure gauge at one end began to fall four minutes after a vacuum pump had been started at the other end. He stated that the system of using a vacuum pump at the end of the return pipe

was largely used in heating buildings, and was known as the Gillies & Geegan system, having been first used by that firm.

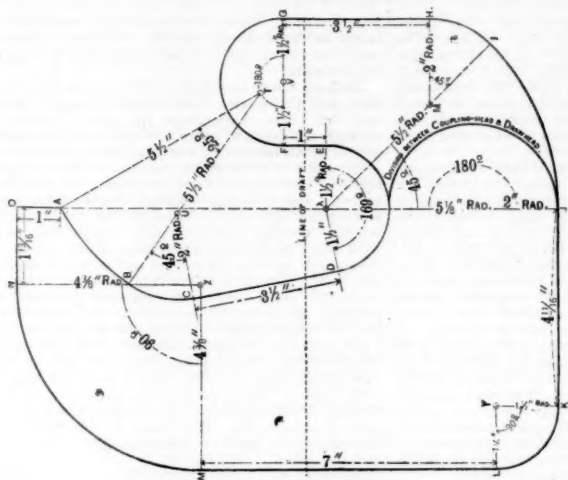
Mr. SEWALL, on the other hand, maintained that a vacuum pump and return pipe were entirely unnecessary on a railroad train, which presented no analogy to a large building. Where there were many thousand feet of pipe the water was condensed, and therefore the pump would work with water only and not with a mixture of water and steam; but with a short train it was probable that but little steam would be condensed, and a pump would consequently work in a very unsatisfactory manner. He believed that in a train the condensed water could be got rid of, and as the amount of steam and heat used was insignificant, no economy was effected by returning the warm condensed water to the tender tank.

Mr. F. D. VAN DEVORT, of the Universal Steam Heating Co., Dunkirk, N. Y., exhibited his coupler, which is a modification of the ordinary union. Both ends are alike and a union nut with handles is provided for each pipe. This style of coupling will not, of course, pull apart without being unscrewed, and requires to be screwed up like any other union to effect a coupling. The coupling has also a ball and socket and sliding joints.

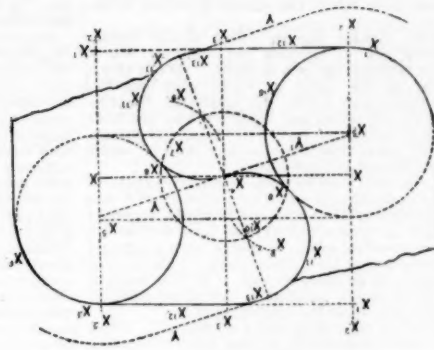
Mr. G. W. CUSHING, the chairman of the committee, then announced that the committee had not come to any decision as to which was the best style of coupler, or as to whether one or two lines of pipe were required, or as to the proper size of orifice. He stated that experience during the coming winter with the different styles of coupling and systems of heating would no doubt aid the committee, and that though, owing to poverty, his road was not trying any system of continuous



THE LORRAINE COUPLER.



The Lorraine Coupler.



The Janney Coupler.

THE CONTOUR LINES OF VERTICAL PLANE COUPLERS.

heating yet, the committee, as a body, would be glad to investigate any coupling or system of continuous heating that was brought before them. He then declared the meeting adjourned sine die.

The Lorraine Coupler.

The accompanying illustrations represent the Lorraine coupler, manufactured by the Lorraine Automatic Car Coupler Co., of St. Louis.

This coupler is of the vertical plane or Master Car Builders' type. The head swings open by gravity, and is locked by gravity by means of a vertical pin in the centre line of the drawbar, the locking pin being of oval cross section and resembling a much used form of ordinary coupling pin.

The knuckle differs in shape from the Janney, the arms of which are approximately at right angles to one another, while, as will be seen, the arms of the Lorraine knuckle are nearly parallel to one another.

The locking pin and projections on the rear arm of the knuckle make a connection between the knuckle and drawhead sufficiently strong to take the draft and buffing strains when the knuckle pin is withdrawn.

Illustrations and descriptions of the lines of this coupler will be found on another page.

The Contour of the Master Car-Builders' Type of Coupler.

At the Master Car-Builders' Convention, held in Minneapolis in June, 1887, the Executive Committee recommended:

"That this association adopt as a standard form of coupling the Janney type of coupler, that the association procure one of the present makes of Janney type of coupler, selection being made by a committee appointed for that purpose and then all other forms of couplers that will couple to and with this coupler under all conditions of service are to be considered as within the Janney type and conforming to the standard of this association."

This recommendation was afterwards adopted by letter ballot.

A sub-committee met to ascertain by actual experiment what vertical plane couplers would couple with the Janney under all conditions of service, on sharp curves, etc., when the question was raised whether all couplers that would couple with the Janney must not necessarily be of such similar form or contour as to infringe the Janney patent of 1879.

The question is an interesting one, and the following description of the method of laying out the lines of the Janney and Lorraine couplers will be interesting to many of our readers. The inventors of these couplers have given especial attention to the form or contour of their couplers. It will be observed that the diagram and description of the lines of the Janney coupler are contained in the patent No. 212,703, issued to Eli H. Janney Feb. 25, 1879, and filed May 23, 1877. The description and diagram of the Lorraine coupler were furnished us by the inventor, Mr. M. J. Lorraine.

The main differences between the lines of the two couplers will be found in the position of the pin on which the knuckle pivots and in the form of the inner face of the knuckle. In the Janney the two curves run into one another, forming a reverse curve, while in the Lorraine the two curves are united by a tangent.

The following quotation from the Janney patent describes the manner in which the lines are obtained:

"The peculiar manner of laying out a coupling is important, and the same will now be described:

"See, Fig. 11, represent a centre line, and $x^1 x^1 x^1 x^1$ lines parallel thereto, drawn at a distance of 3 in. $x^2 x^2 x^2 x^2$ represent lines at right angles to the first series, which are drawn 6 in. apart. $x^3 x^3$ represent a transverse centre line between these lines.

"The lines $x^1 x^2$, it will be observed, form a perfect square with a side of 6 in.

"By means of this the lines of construction for the various parts can be readily obtained, and also their relative positions, as follows: Upon the lines x^1 , upon opposite sides, take a point, x^5 , 2 in. from the line x^2 , and describe the circle x^6 with a radius of 2 in. From the centre x^4 describe the circle x^7 with a radius of $1\frac{1}{2}$ in. From the centre x^5 ,

where the circles x^6 and x^7 cut each other, describe the arc x^8 with a radius of $1\frac{1}{2}$ in. From the centre x^{10} , where the circles x^2 and x^8 cut each other, describe the semi-circles x^{11} , which form the heads of the hooks.

"It will be observed that the circles x^6 form the pivot portions of the hook, and the semi-circles x^{11} the adjacent head portions of the hooks. These two are united to complete this portion of the couplings by a straight line, x^{12} , and an arc, x^{13} , of a circle struck from the centre, x^4 , with a radius equal to the diameter of the circle, x^{11} ."

The claim relating to the form of the Janney coupling is as follows:

"8. A coupling substantially as described, that is, a hook head b' and draw head a having a continuous outline formed of two equal semi-circles in reversed positions, as shown in figs. 11 and 12."

The following is the method of laying out the Lorraine coupler:

"Commencing at A (see diagram) throw out a radius in any direction having a length of $5\frac{1}{2}$ in. With this radius describe a curve to the left covering an area of 25°. Then at B compound the curve into one with a radius of 2 in., and describe an arc of 45°, which will bring you to the point C , from which throw out a tangent to the curve, which tangent in length shall be $3\frac{1}{2}$ in. Then from D describe to the left a curve with a radius of $1\frac{1}{2}$ in., covering an arc of 169°. Then from E throw out a tangent 1 in. in length. From F then describe to the right a curve of 180°, with a radius of $1\frac{1}{2}$ in. From G throw out a tangent from the curve $3\frac{1}{2}$ in. long, and from H , with a radius of 2 in., describe a curve to the right of 45°; compound this into a curve of 45° more, with a radius of $5\frac{1}{2}$ in.; and from J throw out a tangent $4\frac{1}{4}$ in. long. From K , with a radius of $1\frac{1}{2}$ in., describe to the right a curve of 90°, and from L throw off a tangent 7 in. long to M , from which point, with a radius of 4 in., describe another curve of 90°; and from N throw off a tangent $1\frac{3}{8}$ in. long to O . O will then be exactly opposite the initial point A , 1 in. away. Join the points A and O round the corners at A and O , and the design is complete.

"The curve $G F$ of an opposing coupling-head will then fit into the curve $D E$, having the same radius, and the compound curve $H I J$ will fit into the compound curve $A B C$, similarly constructed. The arc $D E$ being less by 11° than the arc $F G$, allows the free movements of the nose of an opposing inclosed coupling head on curves, and when such an inclosed coupling-head has reached the limits of its movement it will fit completely the arc $E D$, the tangent $D C$, which is of the same length as the tangent $G H$ and the compound curve $C B A$."

Steel Car Axles.*

The adoption of steel axles has been looked at too closely from the point of first cost. In all cases where steel has been used in the arts the maker and user have had to co-operate to establish the right quality, and the problem has generally been solved by the maker, the standard of quality of the product being maintained by tests made under the supervision of the buyer.

Open-hearth steel is a better material for axles than Bessemer metal, because it is more uniform and has more ductility for a given elastic limit and ultimate strength. The ingot should be of sufficient size to insure a thorough working of the metal in blooming. Carbon exists in steel in two principal states, hardening and non-hardening. Hardening carbon is that form of carbon found in steel which has been hardened—i. e., heated to a high red heat and quenched in water. Non-hardened carbon is that form of carbon found in steel which has been heated to a red heat and slowly cooled.

If steel be heated to a certain temperature, W , nearly all its carbon changes to hardening carbon, and the change is quite sudden. If the steel be cooled slowly from the temperature W , the carbon remains in the hardening state until a somewhat lower temperature, V , is reached, when it begins to change to non-hardening carbon. This change is somewhat slow, so that if the steel be suddenly cooled in water there is not time for the change to take place, and the result is hardened steel. There is a certain chemical force in the change of carbon which causes a breaking up of the crystals when the change is from non-hardening to hardening.†

1. The chemical energy of the change of carbon is commensurate with the amount of carbon present.

* Abstract of a paper read at the Philadelphia meeting of the American Society of Mechanical Engineers, by John C. Brinell, of Johnstown, Pa.

† This theory was first propounded by Herr Brinell in 1885.

2. The work to be done in breaking up the crystals is commensurate with their size, and is somewhat modified by the character of the crystallization. The following facts confirm these statements: A steel bar containing 0.50 per cent. carbon was heated to a high temperature and cooled. Its fracture then was coarse crystalline. It was then heated to temperature W (the refining temperature of Mr. Metcalf) and cooled in water. Its fracture was almost amorphous, no crystal forms being visible by the naked eye. A bar of steel of 0.20 per cent. of carbon was then treated in the same manner throughout; the result was a fracture fine in places, but in general presenting outlines of the crystal forms of the size of the original crystals. Heating this bar again to temperature W and cooling in water, the fracture was as fine as in the first case, the reason of this being that in the second treatment it had exactly the same amount of carbon energy to act on a less stubborn structure.

3. While the carbon is changing to its non-hardening state, a force is exerted which has a tendency to break up crystallization. Its observed effect is to cause a darker colored fracture, owing to the crystal faces being dull, each face having small particles adhering to it, rent from the face of its neighbor, showing that there must have been an interchange or an interlocking of molecules, rendering the cohesion between the faces very great. As there are as many striking phenomena manifested in the change of hardening carbon to non-hardening as in the change from non-hardening to hardening (among them being the reheating, re-expansion and temporary weakening), it would seem that there was as much force exerted tending to break up crystallization as when the change is the other way, and the probable cause of its not doing so as completely is that more resistance to destruction is offered by the colder crystal.

While steel is cooling the carbon begins to change to the non-hardening state at a dark red heat, and it would appear from the phenomenon of water annealing that it had nearly all changed before the steel ceased to show red in the dark; on the other hand, if a piece of steel be hardened and then heated, its carbon begins to change its state at a quite low heat (some change having taken place at a faint straw-color), and when a heat is reached which shows red in the dark perhaps the greater portion of it has changed. So it will appear that the greater amount of carbon may change to non-hardening carbon at two widely differing temperatures; and if advantage is to be taken of this change to assist in breaking up crystallization, and if the previously stated surmise be correct that the colder crystal is more stubborn, it would follow that the best way to utilize this change would be at its higher temperature.

4. If steel be cooled very slowly from a molten state cubic crystals are formed, with little cohesion between their faces, each crystal in itself appearing amorphous; but in an ordinarily cooled steel ingot, it is very difficult to observe any well formed crystals, the irregular plane surfaces appearing more like cleavage planes than like faces of crystals. What appeared to be well formed prisms have been taken out, with dull faces, but on breaking them they were found to be composed of innumerable smaller crystals, or, it may be interspersed with irregular cleavage planes running in all directions. The tendency may be toward true crystallization, and as far as can be judged the smaller crystals may be perfect, but many of the so-called large crystals are composed of smaller ones with coincident faces, and there seems also to be a tendency to separation between some of the faces. What kind of material (if any) lies between the faces, I do not know; but if they are separated by a material distinct from the body of the crystal there seems to be a fight for this material. Be this as it may, the relation between different crystals and different faces of the same crystals seems to be different, for as the cooling progresses to the point where the carbon changes to non-hardening carbon the effect will be to make only some of the faces dull, the others remaining bright, the amount of carbon present determining the color of the fracture by this action.

5. All crystallization takes place above temperature V , for if a piece of steel in which its carbon is in the non-hardening state be heated to temperature V and cooled in any manner and any number of times, no change will be observed. The exception should be made, however, of that structure which takes place where a moderate heat is maintained for a long period of time, extending into weeks or months.

6. If steel be heated to temperature above W its crystallization is in the most part determined by the temperature, and occurs while heating, not because there is no tendency to crystallization while cooling, but at temperatures below a white heat there appears to be a maximum crystallization for each temperature; this has some exceptions.

7. At a white heat steel becomes nearly, if not quite, amorphous; if cooled quickly from this heat the crystals are fine, for, be it remembered, it takes time for all crystals to form. They become larger as the cooling is slower up to a maximum size, after which the further effects seem to be to change the relative cohesion between different faces, causing cleavage surfaces, the exception to this being where the steel is heated to a very high white heat and allowed to cool very slowly through a period extending over weeks.

8. If steel, with a sufficient amount of carbon, be heated to temperature W , and becoming amorphous thereby, be then cooled, a certain amount of crystallization takes place while it is cooling to V . The slower the cooling the larger the crystals up to a maximum size; the further effect of slow cooling, as in the case just cited, being to change the relation between the crystal faces. This is illustrated by cooling

defective in your ordinary truck, and your method of overcoming such defects.

6. Do you use a dust guard for your journal boxes; and if so, describe the kind giving the best results?

7. What is the size of your standard tender journal and axle?

8. What material do you consider the best for journal bearings?

9. What diameter and kind of wheels do you use in your tender trucks for different kinds of service, and what diameter would you recommend for fast passenger service?

10. If you use steel tired wheels, are you troubled with flange cutting, and to what do you attribute it?

11. In using steel tired wheels, have you found that the life of the truck is lengthened, or requires less repairs because of the smoother running of the steel tires? If so, can you give any data?

12. What material do you prefer for axles, and what are your reasons for the preference?

We trust that all will respond to above queries, and contribute any other information that will be valuable to committee in compiling report on this subject.

E. M. ROBERTS,
Committee.
H. D. GARRETT,
H. D. GORDON.

Address answers to E. M. Roberts (Ashland Coal & Iron Railway), Ashland, Ky.

TIRES; ADVANTAGE OR OTHERWISE OF USING THICK TIRES.

There are two methods of determining the relative value of thick as compared with thin tires. One is by making tests of the density of a number of specimens of each from the same maker, to determine whether the soft core is proportionally larger in one than the other. This method is misleading, and cannot be accepted as conclusive, since it has not yet been definitely established whether the rolling friction desired may not be greater in a soft tire, nor does this method take into account the elements other than relative density which cause abrasion of the tire surface, as the frequent use of sand, slip incident to curves, slipping on grades, over-cylindrical engines, etc. The other is the crucial test of daily wear, and includes all the causes which combine to wear the tire. To make a reliable comparison of these values, the committee require tabulated information in the following form showing the mileage made during the lifetime of a series of heavy and light tires of same makes.

	.....Rail.....
To Chairman of Committee on Tires:	
Below please find record of wear of steel driving-wheel tires under engine No.	
Kind of service	
Kind of driving wheel brake	
Brand of tires	
Original thickness	
Miles run to first turning	
Thickness after first turning	
Miles run to second turning	
Thickness after second turning	
Miles run to third turning	
Thickness after third turning	
Miles run to fourth turning	
Thickness after fourth turning	
Miles run to fifth turning	
Thickness after fifth turning	
Miles run to sixth turning	
Thickness after sixth turning	
Thickness when taken off	
Total miles run	
Cost of 1,000 miles wear	

Master Mechanic.

In addition please state—

1. Does the use of heavy tire increase the adhesion of the engine enough to appreciably reduce the quantity of sand required?

2. Can the engineers' manner of handling the engine affect the lifetime of the tires in any great degree?

3. Do you consider it advisable or otherwise to increase the weight of the driving wheel centres beyond the actual weight necessary for strength and durability, in order to gain adhesive power, or would it be advisable to add such weight where it would be relieved by springs?

4. Do not heavy wheel centres, with thick tires, produce flat spots upon the tread of tires much sooner than light wheel centres and light tires?

5. Is your road heavily graded or comparatively level, and what is the character of the traffic? Are passenger trains run fast with frequent stops? Also, are your freight engines rated to a high maximum of cars per train?

The name of makers and comparative value of different makes of tires will be regarded as strictly confidential between the makers of reports and the committee.

J. W. STOKES,
C. E. SMART,
HENRY SCHLACKS,
Committee.

Address replies to J. W. Stokes, Ohio & Mississippi Railroad, Pana, Ill.

RELATIVE PROPORTIONS OF CYLINDERS AND DRIVING WHEELS TO BOILERS.

What rule do you follow in designing boilers for passenger, freight and switching engines? To illustrate the same, please give as examples the heating surface of fire-box and flues, also grate and flue area necessary to give best results in each of the following cases with bituminous coal of average quality:

1st. Passenger engine: Cylinder, 18 by 24 in.; mean diameter of driving wheels, 61 in.; speed, 40 miles per hour; cut off at 50 per cent. of stroke.

2d. Freight engine: Cylinder, 20 by 28 in.; mean diameter of driving wheels, 54 in.; speed, 25 miles per hour; cut off at 60 per cent. of stroke.

3d. Switching Engines: Cylinder 18 by 24 in.; mean diameter of driving wheels, 49 in.; speed, 8 miles per hour; cut off at 70 per cent. of stroke.

Boiler steam pressure in all cases assumed to be 160 lbs. and 7.5 lbs. of water evaporated by each pound of coal.

CHARLES BLACKWELL,
Committee.
CLEM HACKNEY,
JOHN MCGRAVEL.

Replies should be addressed to Charles Blackwell, care Angus Sinclair, Sec. Am. Ry. Master Mechanics' Association, 175 Dearborn street, Chicago.

PURIFICATION OR SOFTENING OF FEED WATER FOR USE IN BOILERS.

1. Have you experimented with chemicals for the removal or prevention of scale in locomotive boilers?

2. Have you experimented with mechanical devices for the same purpose?

3. Have you experimented with chemical or other devices for purifying or softening water in water tanks before delivering the water to the locomotive tank?

4. Have you succeeded in preventing the formation of scale by means of surface blow off cock?

5. If you have used chemicals inside the boiler success-

fully, with what composition have you had the best success?

6. If you have used mechanical contrivances for softening or purifying water after it has been put in the boiler, please give the name of the device with notes of your experience.

7. If you have used chemicals or other devices for purifying the water before being delivered to the locomotive tank, please give name and illustration of the device, and describe the effects produced.

8. Can a mechanical device thoroughly prevent the formation of scale after the water has been put into the boiler without being first purified?

9. Must some chemical agent be used after the water has been put in the boiler without being first purified, in order to prevent the formation of scale?

10. Is a combination of the chemical and mechanical contrivances more desirable?

11. Please send to the committee any information or suggestions regarding the purification of feed water not elicited by the foregoing queries.

HERBERT HACKNEY,
JOHN PLAYER,
W. T. SMALL,
Committee.

Replies to be addressed to Herbert Hackney (Atchison, Topeka & Santa Fe), Topeka, Kan.

PREVENTION OF DANGEROUS ESCAPE OF LIVE COALS AND SPARKS FROM ASH-PANS.

Your Committee on subject No. 7 respectfully requests your early attention to the following questions, and such answers as will prevent the dangerous escape of live coals and sparks from ash-pans, with drawing of your standard ash-pans for both passenger and freight engines, showing the manner of attaching to the boiler and the arrangements of dampers, grate-shakers, and damper rigging, with the cost complete, ready for attaching to boiler, and if patented, state the amount of royalty per engine.

1. What proportion of the fires started on the right of way, bridges, trestles, or other structures of your line, do you attribute to having originated from fire dropped from the ash-pans?

2. What kind of fuel do you use?

3. What is the length of run of your express trains? What of your through freights?

4. Have you any special rule that you require the men to observe in handling dampers and grate shakers and using slash bars? If so, please send copy of same.

5. As a rule, how often is it necessary to clean ash-pans on an express run? How often on a freight run?

6. Have you any appliances not yet perfected, that you think will tend to lessen the danger of fire from this source? If so, please furnish us with a sketch of same.

7. Have you had any experience with the so-called dumping ash-pans? If so, will you kindly give us the results of the same?

8. Do you consider it desirable to wet the ashes that accumulate in the ash-pans? If so, please describe your manner of accomplishing the same? If not, please give your reasons?

Please also forward any additional information of this subject.

G. W. ETTINGER,
E. D. ANDERSON,
W. H. THOMAS,
Committee.

Address answers to Mr. G. W. Ettenger (Newport News & Mississippi Valley), Richmond, Va.

Car-Heating in Massachusetts.

The following table has been received from the Clerk of the Massachusetts Board of Railroad Commissioners. It gives the substance of the replies received by the Board to a circular lately sent out. Several of the companies had not responded when this table was made up.

All the roads light their cars with "mineral sperm" oil 300° fire test. The Boston & Albany has two trains lighted by electricity. They find the cost, exclusive of maintenance of storage batteries, is ten times as much as the cost of the oil lamps. The managers report that they know of no case of the cars taking fire from the lamps on their respective roads.

METHODS OF HEATING PASSENGER CARS AS REPORTED BY THE RAILROAD COMPANIES OF MASSACHUSETTS.

	Cars heated by steam from locomotive.	With Baker or Johnson heaters.	With other hot water or steam heaters.	With hot air heaters.	With stoves.	Remarks.
Boston & Albany	101 Martin. 18 Sewall.	142	14 Searle.		9 baggage cars.	
Boston & Providence	20 Gold. 17 B. & P. System.					Comp'y is fitting cars for steam heat as fast as possible. No warmed by stoves, etc., not reported.
Fitchburg	11 Sewall.	17	1 Searle. 11 Westinghouse.	60 Spear. 6 Creamer.	188	
New York & New England	4 Sewall. 13 N. Y. Safety.	3		109 Spear.	50	Fitting 11 more with N. Y. Safety.
Old Colony	8 Sewall. 4 N. Y. Safety.	214	2 Thayer.		75	
Cheshire				A few Spear. 10 Spear.		Number of stov's not stated. [Wood and coal burners.
Connecticut River	24 Emerson.	1		17 Spear.	11	
Housatonic		35				None but Baker heaters and Spear hot air stoves now in use.
N. Haven & Northampton						
New London Northern	May try one this winter.	A few			Most of the cars.	
Providence & Worcester	3 Sewall. 17 Martin.	11	1 Westinghouse.	6 Spear.	28	
Boston, Revere Beach & Lynn						Of their own system; all they use in winter.
Worcester & Shrewsbury	23				All.	

THE SCRAP HEAP.

Mr. Ives' Turn.

And now the volatile and mercurial Mr. Ives has sued President Julius H. Dexter, of the Cincinnati, Hamilton & Dayton, for \$100,000, to get square with the latter on the false imprisonment of a week ago. No order of arrest was obtained. Mr. Ives heaps coals of fire on the head of Mr. Dexter by pursuing less harsh tactics. But he expects and will try to get the \$100,000.

Diggles' Wriggle.

A transcendent scheme for putting a girdle round the earth in a little more than forty minutes receives notices in the New York papers this week. According to the Times, Mr. J. H. Diggles, and according to the Tribune, Mr. J. H. Stiggles, is now in Ottawa taking steps to renew a charter held by himself and other "capitalists" for building a railroad

from Calgary, in the Northwest territory, northward to Athabaska Landing, just beyond Edmonton, "at the threshold of the rich and fertile Peace River country." By means of a road from Quebec to Labrador and a fleet of ocean greyhounds on the Atlantic, Mr. Diggles proposes whizzing passengers from America to England in about three and a half days. The alleged importance of Mr. Diggles in Wall street does not obtain the credence that it might if any one in that neighborhood had ever heard of him before.

Sisterhood of Locomotive Engineers.

Branch No. 6, Sisterhood of Locomotive Engineers, was successfully organized in Susquehanna, Pa., last week. A Presidentess and several lesser officers were elected. We presume that the functions of a Sisterhood of Locomotive Engineers are to keep the bright beacon of hope and supper ablaze in the windows of their respective domiciles along the line, thus illumining the hearts and appetites of their spouses or sweethearts, and also to keep the Babyhood of Locomotive Engineers from making mud pies on the railroad track. Whatever else a Sisterhood could do would be outside woman's sphere and could undoubtedly be performed more effectively by a Brotherhood.

Attempt to Wreck a Train.

A determined but futile attempt was made to wreck a passenger train from Boston at Northborough, Mass., on Dec. 18. Seven sleepers had been wedged in between the rails, but the ice and snow on the track caused the obstructive to slide along ahead of the locomotive after it was struck. The fiend was not captured.

Gusts that Disgust.

The first genuine, full-fledged blizzard of the season struck Dakota on Dec. 20. It was accompanied by a storm of fine snow, fierce winds, and a temperature or 20 degrees below zero. All trains were much delayed, and those on the Chicago & Northwestern were abandoned entirely. The same blizzard swept over Kansas and Missouri on the same day. At Kansas City there was six inches of snow, and the mercury hovered about the zero point. All the railroads were seriously impeded. The greatest sufferers were the Southern Kansas and the Kansas City, Ft. Scott & Gulf lines. On the latter road trains were six hours late.

Sweetly Sleeping.

A drunken laborer named John Davie, at Dowlais, Eng., on his way home laid down beside the railroad track so close to the rail that, a train coming along, the engine ran over and cut off the heel of his boot. When the train stopped and backed up the man was still asleep, and was indignant at being made to get up and go home.

A Large Tender.

The Evening Gazette (Port Jervis) states that "a tank for a locomotive tender is being built at the Erie shops at Hornellsville, which will hold 36,000 gallons of water." With a commendable spirit of moderation our contemporary contents itself with observing that "it is the largest ever built for the Erie." It seems a pity the tank was not made a little larger, so that the engine could if necessary run from here to San Francisco without stopping for water. The trouble seems to be that the tank already weighs more than the whole of the rest of the train. The saving in track tanks, however, is an item not to be despised, especially when they cost some \$80,000 per dozen f.o.b., as at present. Possibly the booby car traffic on the Erie is growing to such proportions that this large quantity of water is needed to supply the hot and cold tea-pots of that department.

Vestibule Cars.

The Pullman Palace Car Co. has filed a bill in Chicago against the Wagner Palace Car Co. and the Lake Shore & Michigan Southern road for infringement of letters patent to Henry Howard Session, assignor to the Pullman company, dated Nov. 15, 1887, for an improvement in the construction of railroad cars known as a "vestibule" train. Sessions was manager of the Pullman works at Pullman, and the invention which the defendants are said to have infringed is a combination with the end of a car of a frame plate, or equivalent series of buffers, backed by springs, whereby, on coupling two cars, the spring buffer will be interposed between the superstructures of the adjacent cars, thus preventing rocking and lateral swaying of the train while in motion.

	Cars heated by steam from locomotive.	With Baker or Johnson heaters.	With other hot water or steam heaters.	With hot air heaters.	With stoves.	Remarks.
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Boston, Revere Beach & Lynn						Of their own system; all they use in winter.
Worcester & Shrewsbury	23				All.	

It is claimed that the use of vestibule trains by the Pullman Co. has met with such success that the Wagner Co. sought for a license to run them, but was refused by the Pullman Co. The Wagner Co. thereupon, it is asserted, appropriated the improvement without right, and has illegally and wrongfully applied it to a train of cars to be run over the Lake Shore & Michigan Southern Railroad to New York. The offending companies have been given notice that they would be proceeded against if they employed the invention. The present suit asks for an injunction to restrain this infringement.

The Improvement of the Seine to Paris.

A project to increase the depth of the Seine between Ronen and Paris to a depth of 28½ ft. is mentioned in Engineering. The Seine is now navigable for sea-going vessels to Ronen, and the proposed improvement will, it is asserted, reduce the cost of freight from that city to Paris by one-half, by saving transference of freight to barges as at present.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The subcommittee of the Master Car-Builders' Association have held another meeting as to the adoption of a standard form of vertical plane coupler which will be known as the M. C. B. type of coupler. The merits of the contour lines adopted by Messrs. Janney, Lorraine and others were fully discussed, and the meeting was ultimately adjourned in order that Mr. John W. Cloud may devise some means of arriving at a satisfactory solution and produce some lines that will couple under the most trying conditions.

More than usual space is given this week to the proceedings of the New England Railroad Club at its last meeting, but they were more than usually interesting. Mr. Lauder's paper on the freight train brake, and the remarks which followed in discussion give valuable light on the state of opinion among railroad officers of experience and judgment. Naturally no new arguments for the application of continuous brakes to freight trains were presented, but the familiar arguments were restated, with the weight of practical knowledge. The opinion was expressed by Mr. Lauder that the cost of equipment and maintenance would soon be recovered by the saving of cost of accidents, and Mr. Marden believed the use of the air brake would lessen the expense of repairs one-third or one-half. The economy in operation to be expected from the increased speed of freight trains was also alluded to. It is of interest that the Fitchburg will fit all new freight cars with the Westinghouse automatic brake.

The committee organized to select a standard coupler for continuous heating has now heard the merits of a variety of couplers set forth by the inventors, but has not come to any decision as to future action, except that it has been tacitly agreed to let the coming winter test practically the merits of the different devices. While it would be impossible at this stage to adopt any coupler or system of heating, it seems a pity that the committee did not define the essential features which any good coupler must possess. This step would at any rate have guided inventors and saved much waste of time and money over devices which are hopelessly wrong in principle, and can never in their present state be generally adopted.

The committee might also have arranged for a series of carefully conducted competitive tests of some at least of the principal systems. Such tests made under similar conditions on a Northern road in midwinter would have done much to show the proper diameter of train pipe, and the necessity or otherwise of two lines of pipe. These points must be decided before any particular coupling can be adopted. The fact that independent experience on individual roads does not really bring out the bottom facts as to the merits of an invention has been shown again and again.

The relative merits of loose and tight car couplers were not decided until a series of tests had been made on the Chicago, Burlington & Quincy under the sup-

ervision of skilled observers. Similarly buffer and other freight brakes have been largely used, but it was not until a systematic test under trying conditions was made at Burlington that the real facts as to the merits and demerits of the different brakes became manifest. It is possible that somewhat similar tests with different steam heater couplings would also yield much valuable information and afford data for comparison, which is impossible unless the trials are made under similar conditions and the results carefully noted.

The report on the Chatsworth disaster, which has just been made by the Illinois Board of Railroad and Warehouse Commissioners, does not read like the production of a railroad expert, but contains some suggestive points, nevertheless. It says the corporation was blameworthy in not having its road patrolled, and makes a number of recommendations which many officers will do well to consider, even if they cannot at once carry them out. It is often good to get the carefully formed opinion of intelligent men, even if they are not skilled in the art of railroading.

To the argument that other roads were no more careful than this in guarding against prairie fires in a very dry season, the Commissioners answer that it was merely the other roads' good fortune that they did not also have similar disasters. The report recommends that large trains carrying a great many passengers be run in sections, and that one station should always intervene between the sections; that when double headers are run, both engines have air brake connections, and both runners be men "known to possess coolness, experience and skill, and accustomed to passenger running;" that the track should, under circumstances like those in this case, be patrolled before each train, and that this can be done at comparatively small expense; and that short wooden structures should be replaced with iron or stone, because they are generally inspected with less care than is given to larger bridges.

It will be noticed that the commission virtually demands the block system. While this may seem to many like a somewhat impracticable requirement, it is to be remembered that it is an unbiased opinion, and one that will be approved by the public (if the public finds time to notice it); and if it is necessary or suitable for large trains, why not for others? While double headers are specifically condemned under certain circumstances it seems to be assumed that in others they will be run. To what degree a road can afford to have its freight runners (who must often be the only spare force for the passenger service) kept familiar with passenger running so as to be deemed "accustomed" to it, is a question; but all will acknowledge that this end is desirable. The common practice of taking an old passenger runner for a special train and putting the less experienced freight man on the regular passenger in his place is evidence of this. Whether track inspection of a satisfactory kind can be done at "comparatively small expense" is a question on which most railroad men will disagree with the board. If rates are to be reduced by arbitrary laws as soon as a road gets a little money ahead they will be of a decidedly opposite opinion. As to short bridges being as dangerous as long ones, it is to be hoped that the fact of the disaster itself will prove to have been a sufficient warning, if any were needed. Much of the care and watching that is given to long or high bridges is of course merely to guard against the large pecuniary loss which would be entailed by the destruction of the structure itself, aside from any derailment of trains.

The announcement that the Trunk Line Presidents have agreed upon a plan for accomplishing an equalization of business upon different lines, places the operation of the Inter-state Commerce act upon a new basis. The legality of what they have done may be called in question. It undoubtedly is intended to defeat the intention of the framers of the clause against pooling. On the other hand, the proposed procedure does not apparently conflict with the letter of the law. As we understand it, if a railroad is actually found to be losing traffic, it will be allowed a differential; but if this action results in depriving the other roads of their traffic, it will not be continued on the same scale. If traffic associations are to exist at all, they must have the power to agree on differentials, or to withdraw them. The only way in which they can determine whether they are just is by the relative amount of traffic which the different roads get. The report of the Inter-state Commerce Commission speaks favorably of traffic associations. The Commissioners obviously regard them as an important feature in good railroad economy, advantageous to the public as well as to the roads. The history of the dressed beef rate contest shows that the Trunk lines have been forced

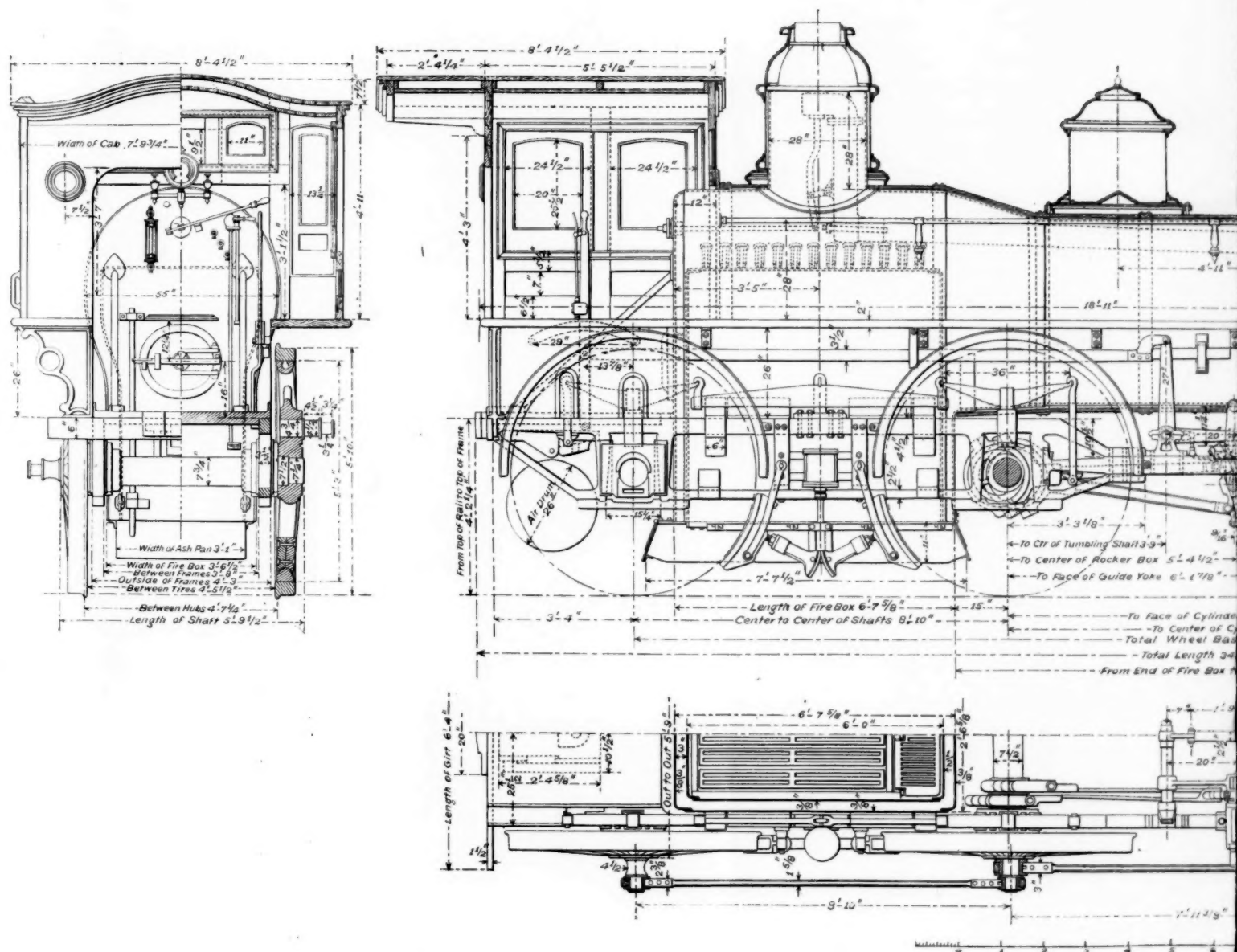
into their present action in sheer self-defense as a means of protection to legitimate interests, rather than with the purpose of attacking the law. We see every reason to hope that the Commissioners will uphold them in so doing, and if they are upheld by the Commission they have little to fear from the courts.

Those who think that state railroads are managed on different principles from private ones under similar conditions will find some interesting matter in the Report of the Hungarian Minister of Transportation for the current year. He says in substance this: "We were in a position where we were forced to do two things: to develop business and to make more money. We have succeeded in combining the two results by a system of special rates [*Tarifbegünstigungen*]. If you see how many of them we have made, you will find an evidence of our care for industry. There is hardly a line of business where we have not granted them. Moreover, we have done our best to form pools which should leave us free in the matter of rates; and we have paid special attention to getting business away from other lines with which we had no pooling contracts." This is the more instructive because the Hungarian state railroad system is an old one, and controls most of the lines in the country. It shows that if they are hard pressed financially, they will be run to make money, and that they will then do precisely the things which are done by private companies. In the matter of special rates they go to the utmost length allowed by the Inter-state Commerce law in our own country; in pooling, or in securing competitive traffic in default of a pool, they go even further.

The Running Gear of Freight Cars.

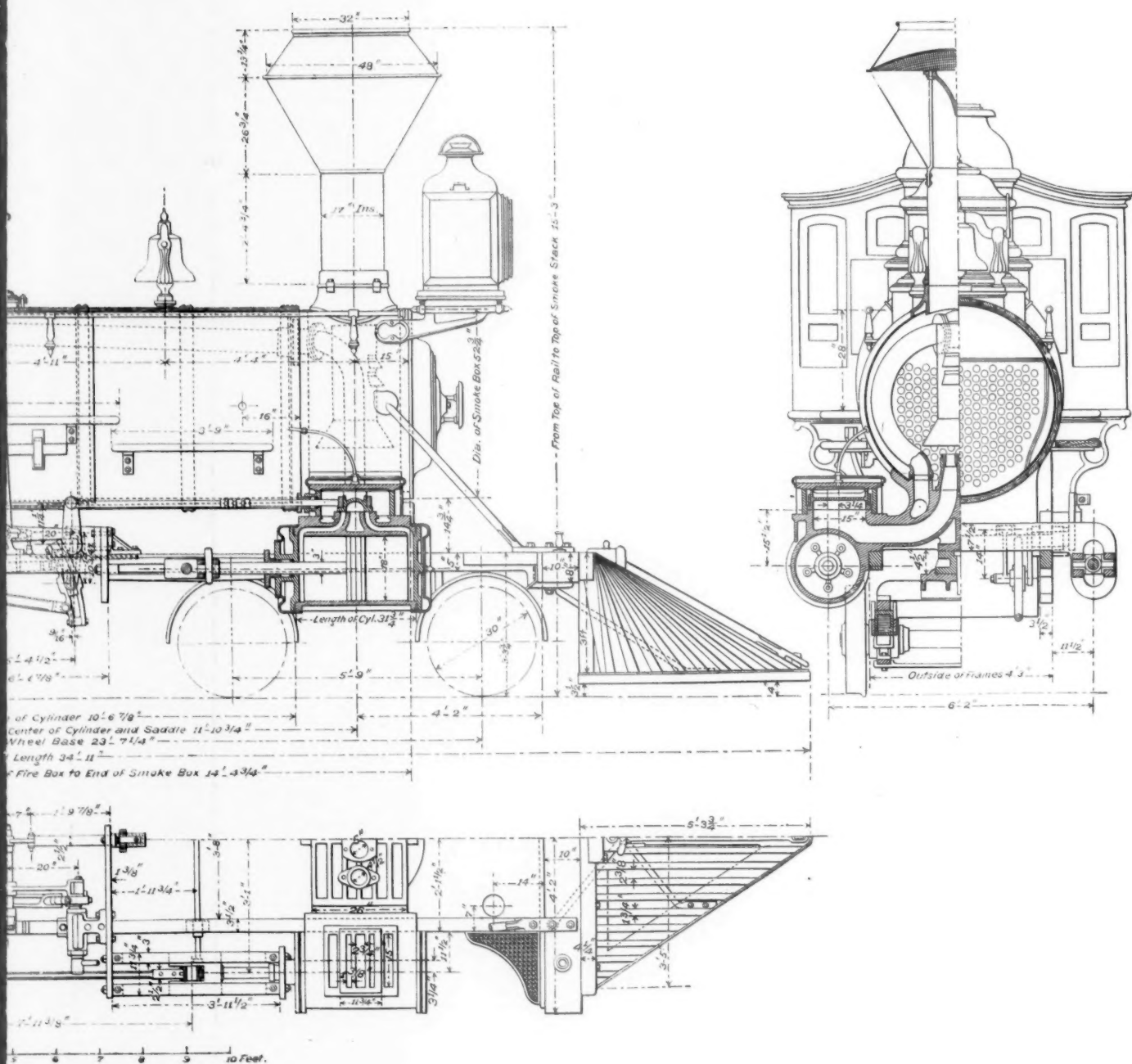
The three articles relating to steel axles, which we print in another column, are especially interesting at the present moment, when it is proposed to place considerably greater strain on car axles. The combination of the greater loads and greater speeds that are now proposed and rendered possible by the advent of tight couplers, heavier rails, and last, but not least, of continuous freight brakes, should make us consider whether any corresponding improvement has been made in the running-gear. If the future freight car is to carry 60,000 lbs., and to weigh something like 30,000 lbs., a weight of 45,000 lbs. is placed on two axles of moderate dimensions, and on a 5-ft. wheel-base. To render the work more severe on the axles and on the permanent way, the truck is absolutely rigid and does not permit of any equalization of weight between the different wheels, and it is perfectly possible that the whole of this weight may be borne by the two wheels at opposite corners of the truck. The danger of broken axles is very considerable. It involves not only a risk of derailment, but, on a double-track road, where trains are presumably run at their highest speed and are most frequent, it involves the risk of a collision between the derailed car and a train proceeding in the opposite direction on the other track. The disastrous results of such an accident at the Horseshoe Curve, on the Pennsylvania Railroad, will be fresh in the minds of all. The method of strengthening steel car axles described by Mr. Coffin deserves careful consideration, especially as an explanation is given of the reasons why this treatment should change the molecular structure of steel and so strengthen the axle. Steel is, notwithstanding its extensive use, a mysterious substance, and, though possibly the steel age is already doomed to be superseded by the aluminium age, we are yet only at the threshold of understanding fully the nature and properties of steel.

We may also derive some light as to the proper dimensions of steel axles for future freight cars by a perusal of the specification drawn up by the associated English railroads as to the dimensions and strength of axles necessary there. It will be seen that their axle is in every particular slightly larger than our M. C. B. latest standard. The tenacity specified is higher and the drop test is more severe, the bearings on which the axle is placed being 6 in. further apart than in the case of the Pennsylvania tests; and this is in spite of the fact that axles do not have to run over a deeply frozen roadbed and are not so heavily laden. Allowing a maximum weight for an English freight car, the load per axle would be about 17,400 lbs. Allowing a minimum weight of 27,000 lbs. only for an American 60,000 lb. car, the weight per axle would be 21,750 lbs., or fully 25 per cent. in excess of that on the English axles. It is a moot question whether the use of an independent semi-elliptic spring, 36 in. long, above each axle-box, would not distribute the weight better than our arrangement of diamond truck. However this may be, and it is a question on which there is fair ground for difference of opinion, it is



PASSENGER LOCOMOTIVE, CHICAGO & NO

Designed by G. W. TILTON, Supt. Motive Power, and Built at



& NORTHWESTERN RAILWAY

Built at the Company's Shops, West Chicago.

tolerably evident that the English axle is stronger and has less work to do than our own M. C. B. standard axle, even when the latter is made of steel, which is by no means always the case. It would therefore appear possible that at no distant date the question of a third and still stronger M. C. B. standard axle will have to be seriously considered.

The minimum dimensions of English freight cars, as given on another page, are interesting as showing what experience in running fast freight trains has dictated as to the scantlings of the cars required to render fast traveling safe from accidents and free from delays and break-downs. It will be observed that the freight cars are less than half the capacity of those we are now building, yet the various parts are made stronger. Sills 12 in. by 5, of white oak, sound somewhat large to our ears. Wheels with wrought-iron hubs 9½ in. diameter, or slightly in excess of that used here on a cast-iron wheel, would also seem to possess a very large margin of strength. Steel tires not less than 2 in. thick when new, and properly fastened to a wrought-iron skeleton, also seem to possess a degree of strength and security which we have not yet considered necessary in freight equipment. The extra expense of the stronger sills, the heavier steel axles, the wrought-iron wheels, turned on the rim, with bored steel tires shrunk on and secured by safety fastenings, the wrought-iron pedestals and a draw gear without pins or cotters, made of chain cable iron to stand the Government test, all seem to involve considerable extra expense, and if a good many years' experience in running freight trains at 30 miles an hour has there shown that such a strong and expensive style of construction is absolutely necessary to prevent accidents and insure regularity of running, it behooves us to consider whether fast freight trains will be profitable or whether, with our present style of running-gear, we can obtain adequate security with our cheaper methods of construction.

Accidents to Trespassers.

In our legal notes will be found a case showing how little right a railroad company sometimes has on its own right of way. A man walking beside the track was hit by a cow which a locomotive threw from the track. Of course he sued for damages, and almost of course he got them. This was in Alabama. Probably other courts in other states would have decided for the company. The plain man would think that the trespasser should have been thankful to get off with his life, and that the combination of a cow, a man and a locomotive might have been classed as an "act of God," as far removed from the sphere of human responsibility as a flash of lightning, but the Court evidently had broader notions of the powers and duties of railroad companies. It is evident that a railroad company must be bound to provide adequate protection at public crossings, and at those parts of its track and premises which must be used in common by it and the public, and that it must keep live stock off its tracks; but there is an apparent injustice in holding it responsible for the life and limb of trespassers on its right of way. If a man deliberately chooses to walk on the track because it gives him a short cut or dry footing, and much more, if he wilfully walks across a railroad bridge in spite of a warning sign forbidding such trespass, why should the company be held accountable for any injury he may receive from being where he had no business to be? On the contrary, why should he not be fined or otherwise punished for trespass?

The old theory of the law is that a railroad is in the nature of a public highway, on which the railroad company has only an easement. One result of this theory is the vicious practice which allows people to tempt fate by walking on the right of way, and which offers them a bonus for so hazarding their lives. In some of the states, under the police powers of the state, the railroad companies have been enabled to procure the arrest and punishment of people trespassing on the right of way, but the laws not having been backed up by the opinion of the communities, have been difficult and expensive to enforce. Experience of riots and strikes teaches how difficult it is to prevent the infraction of laws to which people have long been accustomed, and the value of which is well recognized, when the sympathies of the officers of the law are with the law breakers. It is easy to be seen, therefore, what obstacles will be found to a proper policing of railroad tracks, until the public becomes familiar with the notion that railroads are here to haul trains over, and not as cart-roads, foot-paths or cow-pastures. This is a direction in which a correct public opinion would not only profit the railroad companies, but save human life.

The Massachusetts Board of Railroad Commissioners has tabulated statistics of accidents occurring on

the railroads of that state for ten years, from 1877 to 1886 inclusive, and from that table it appears that out of 4,239 casualties to persons, 1,312 were to trespassers. Nearly 31 per cent. of all the casualties were to trespassers. But that is not all. Out of 1,332 casualties to trespassers, 837, or nearly 63 per cent. were fatal. Of accidents to passengers but about 20 per cent were fatal, and of casualties to employes but 26 per cent. From the report of the Railroad Commissioners of Connecticut, for the year ending Sept. 30, 1886, it appears that 35 per cent. of all casualties to persons were to trespassers, and of this class 55 per cent. were fatal. The reports of other states confirm these figures. In Ohio, for instance, over 23 per cent. of all casualties were to persons walking on tracks as trespassers, not including those trespassing in other ways; and of these about 60 per cent were fatal. The Massachusetts Commissioners say that "the number of this class of victims to their own folly varies less from year to year than other casualties."

There has lately been much legislation intended to force railroad companies to provide for the safety of passengers and others. Some of it has been ill-advised and harmful, and some of it is sure to be useful; but the loss of life from the "deadly car stove" is trifling compared with that of the "victims of their own folly," over whom the railroads have no control. Here is a great field for useful legislation. Let lawmakers in all the states, who are ambitious to do good to their fellow citizens, and to win for themselves an honorable and lasting distinction, enact laws that will make it possible and practicable to keep all persons off the railroads' right of way, except at those limited places to which the public must of necessity have access. The measure of good that might be done by such legislation can only be guessed at, but some estimate of it can be made in this way: The train mileage in the state of Massachusetts in the year 1886 was 36,400,000 miles, and in the United States it was about 570,000,000 miles. The average number of trespassers killed per year in Massachusetts was 84, and the number of injured was 50. By simple proportion, those killed in the United States each year would be about 1,300, and the injured 800, or 2,100 in all. It is probably safe to say that all casualties to passengers and employes, from train accidents alone, in the United States, are less than 2,000, while the deaths are probably below 400. But the train accidents are heard of through all the newspapers, while but few ever think of the victims of their own recklessness or ignorance who are picked off, one by one, at the rate of 5.7 souls a day.

The Block System.

The fact that a block system or a modification of it has been in use on the Canadian Pacific for several years, and that the officers of that road express undiminished satisfaction with it, gives or should give a great deal of interest to the question of the practicability of such a system on the average road. Little or none of this kind of train protection is practiced in the United States, though the principal idea of the Canadian Pacific's method is employed in train dispatching every day. Progress in the prevention of rear collisions is far from satisfactory, and anything promising aid in the prevention of such catastrophes as Kouts is sure of the attention of interested inquirers.

But in studying the operations of the Canadian Pacific several questions arise which superintendents desire to have settled before taking action in the matter. While fully appreciating all the advantages of the system as recounted in these columns a few weeks ago, and yet other good points that were not then mentioned, there is doubt whether the system under the rules it is worked by is worth the labor, expense and possible delays involved, and whether there are not loopholes for danger to creep in which will sooner or later bring on a collision.

It is to be noticed that the Canadian Pacific keeps in force the ordinary rules about protecting trains by sending out flagmen, and that, whenever the telegraph fails to give satisfactory protection, trains are to be run from station to station under control. These would appear to be among the weakest points in the plan. A fundamental question is that in regard to how dense a traffic the system can be applied to. All admit that with very infrequent trains a plan of this kind can be easily used; but as trains increase in number, when will it be necessary to have more costly methods of protection? As long as trains are bound to protect themselves by flags, other trains following them will be prone to stretch the term "under control" until it loses most of its meaning. Doubtless some freight trainmen get to regard "under control" as meaning a speed which will admit of their getting off safely

with their own necks, even if cars and engines do receive some damage; but with public opinion growing constantly more critical, it is unprofitable, to say the least, for a road to have a collision even if the harm to life and limb is not serious. The time has passed when minor accidents can be hushed up. Reporters are too plentiful in the settled parts of the country at least, whatever may be said of Arizona and New Mexico.

Running under control, strictly speaking, is slow business, except on straight, level roads in clear weather. The Erie road in its recent trial of the block system found that the running of a large number of freight trains "under control" (very slowly) through a number of block sections very soon delayed passenger trains an hour or two, and in fact blocked a whole division of the road. If the occasions on which the telegraph fails and ordinary time table rules have to be used are at all frequent, the very best discipline under such time-table rules must be readily enforceable, or there will be numerous serious delays.

A system of this kind, of course, necessitates very good discipline of operators; rather more strict, we should say, than for ordinary train dispatching. Under the latter it is indeed essential to have persons who are cautious and trustworthy; but considerable laxity in office hours is tolerated provided the operator has forethought and calculation enough not to get blamed for delay to a passenger train or serious delay to a freight; but it is plain that a block system would generally require a considerably higher standard in this respect. This is not, however, an argument against the block system, as most roads could with advantage improve their telegraph personnel on general principles, regardless of this special object.

In the Canadian Pacific rules nothing is said about the duty of operators to always look for the red tail-signal of a train, and to refrain from giving "line-clear" unless they certainly see it. There is also a chance for operators to make a mistake in sending or in receiving the number of a train. In the absolute block system all trains are protected with equal care, so that the number or grade of the train is immaterial, but if freight trains are not regularly protected there is always the chance that when two trains are on one section the operator may report the arrival of the second when in reality only the first has reached him. This point should not be overlooked, for passenger trains ought to be protected from freight trains ahead of them as well as from those behind. It is a pity to have anything like a block system and not do this.

The main question, however, is how often are mistakes likely to be made? The frequency of blunders will be gauged largely by the number of trains. Some lines already have a traffic which should be protected by all possible safeguards, while others must, perhaps, put up with something less costly. The Sykes electro-mechanical locks, the object of which, as is well known, is to check the attendant if he starts to let a second train into a block before the first has cleared it, is now deemed by many experts as an essential to a perfect block system. This is used on the new signals of the New York, Lake Erie & Western, and will be on those of the New York, New Haven & Hartford; but a large share of the blocking on crowded English lines is still done without any safeguard of this kind, and the Pennsylvania does not use it. How much expense can the Canadian Pacific, or any road, afford in this direction? Rear collisions which happen in spite of the block system generally occur on crowded sections, in or near large yards and junctions, but they are by no means unknown in other localities. An electro-mechanical device like the Sykes apparatus may, therefore, be needed on some portions of a road, before other portions, where trains are less frequent or other circumstances are more favorable, show anything like a pressing necessity. The universal practice in England is to have regular signal boxes and a man in charge, who gives his exclusive attention to this duty. Combining this with other duties, as on the Canadian Pacific, may sometime lead to blunders. Many English officers insist that nothing but the bell instruments should be allowed in a signal station, for the reason that ordinary telegraph instruments allow of conversation between signalmen, which would distract their attention; but this may be classed with the ancient idea that a comfortable cab, is a hindrance to the performance of duty. A telegraph line is a distinct advantage to block signalmen, provided only they are tolerably cool-headed. It enables them to explain to each other circumstances which might lead to delay and ignorant action, if nothing worse. English signalmen are often allowed discretion in side-track

ing freights for passenger trains, allowing them to proceed when the latter are known to be late; this is also done to a limited extent on the Pennsylvania. With telegraphic communication to a further distance (generally it is on y for the length of one block each way) it could be done to still greater advantage. With the intelligent operators who can be so cheaply secured on American lines, there could doubtless be considerable improvement in the facility with which freight trains are got over crowded lines.

While, therefore, a system like the one under consideration is far from perfect, and is, in fact, liable to the very combinations of circumstances which have produced some horrible collisions in England, it can hardly be questioned that with proper care and supervision it is a distinct improvement over the ordinary plan of maintaining simply a time interval, and that it is worthy of careful investigation by all officers who have not the means of providing a complete system. Undoubtedly an important advantage on a large and growing road is the training it gives to the men in the general principles, so that they will be prepared to use a more perfect plan when it comes.

The Government and the Telegraphs.

Congress is so well pleased with its success in railroad regulation that many members are disposed to extend the same kindly supervision to telegraph companies. Three plans have been proposed: 1. To buy up existing lines and give the Post Office Department a monopoly of the telegraph service. 2. To build new lines to be run by the government independently, and in competition with the old ones. 3. To leave the ownership and operation of the lines in the same hands as at present, but to subject the companies to a system of regulation like that of the Interstate Commerce Act.

The first plan is the most familiar one. It has been repeatedly brought to the attention of Congress, and it was the plan actually adopted in England when they adopted the government telegraph system in that country nearly twenty years ago. Its specific disadvantage is that the lines would undoubtedly have to be purchased at an exorbitant figure. It is impossible for a government to get the lines of a private company at a bargain. They can never be purchased at cost of duplication. England had to pay such high rates for the telegraph lines which she acquired in this way that the working of the system was very seriously hampered during all the early years of its history. Even Prussia has had to give enormous prices for the railroads and other transportation agencies which her government has purchased. She had a nominal right to condemn them, but was afraid to enforce it. If this was the experience of England and Prussia, dealing with isolated companies, what can we expect from the United States government in the face of a company like the Western Union?

The probability of having to pay exorbitant prices has turned men's attention to the second alternative—that of building competing lines. This idea is embodied in the bills which have been introduced into the Senate by Mr. Cullom and Mr. Edmunds. It is open to several objections. In the first place, it would be to some extent a matter of political favoritism which districts had the benefit of a government telegraph. In the second place, it would of necessity involve discrimination against those regions which did not enjoy these advantages. We do not believe, as some writers do, that the government has no right to destroy the profits of the companies by duplicating their lines; but we believe that it would have no right and no power to destroy their profits by competition on one-half of their business and by legal regulations on the other half. Either they would have to let the discrimination go on, or they would have to build competing lines everywhere. The latter course would involve not merely a loss of profit in operation, but a real waste to the country by the unnecessary duplication of plant.

What would be the success of the government in operating a telegraph system, whether competitive or monopolized, can only be a matter of conjecture. The success of the government telegraph in England is the strongest *prima facie* argument in its favor for the United States. Another argument is drawn from the satisfactory management of the post office as it exists at present. Both of these arguments must be accepted with some reserve. The civil service of England is better filled and better organized than that of the United States; the conditions attending the transmission of telegraphic business seem to be, on the whole, more favorable than here. The post office is much better fitted for government management than the telegraph. There is more routine business and less chance for favoritism. There is far less expenditure

of capital, giving fewer chances for fraudulent contracts, and vastly less opportunity for playing tricks with the construction account. The expenses and earnings of the post office can be incorporated in a budget so that we know exactly how much we are making or losing every year. But the telegraph expenses have to be divided into permanent and current ones, in exactly the same way as those of a railroad, and it would be the easiest thing in the world so to arrange the accounts as to make a deficit look like a surplus, or to make bad management look like good management. It would give room for the creation of supernumerary officials who could, if they please, reduce the Treasury surplus in ways undreamed of either by President Cleveland or Mr. Blaine. In a word, it would give an opportunity for irresponsible management which might prove dangerous alike to business and to politics.

These arguments were forcibly urged by Mr. Orton against Postmaster-General Creswell 15 years ago, and were reinforced by others, which tended to show that Europe, with its government telegraphs and its denser population, had no advantages over America in telegraph service. We have not space to give these points in detail, nor to explain why, in spite of all that has been said, there is so much public dissatisfaction with the existing state of things. There is little doubt that Congress will be forced, on pressure of public opinion, into doing something; and in view of the dangers attaching to government ownership, it is sincerely to be hoped that they may succeed in devising some good scheme of governmental regulation. This will be an easy matter. Our detailed experience in the workings of railroad legislation will be of little avail here. The question of allowance for quantity, so perplexing in the case of railroad rates, will involve yet greater difficulties in telegraph control. Yet as an alternative against crude projects of government telegraph building almost any scheme of regulation seems preferable. If men like the Interstate Commerce Commissioners could be found to take charge of its enforcement, even a very imperfect law would prove the germ of something better, as well as a safeguard against something worse.

The New York Central Report.

The report of the New York Central & Hudson River for the year ending Sept. 30, 1887, shows an exceedingly conservative policy in all matters of finance. All the changes in ordinary equipment, including an actual increase of about a thousand in the total number of cars, have been charged to repairs. So have the track and station improvements. The increase in construction account is confined to actual purchases of land, a little over \$100,000 in amount, and \$300,000 for elevator and floating equipment in New York City. Yet even this amount, trifling as it is, was largely met from undivided earnings; the real liabilities being increased only \$87,000, or not enough to cover the actual purchases of land. This fact, perhaps, furnishes the explanation of the apparent increase in expenses per train mile when there was no increase in train load. The change in this respect was considerable, passenger train mile expenses having increased from \$0.73 to \$0.81, and freight expenses from \$1.02 to \$1.09. It came also at a time when the Erie was making a reduction, though a very slight one. The contrast between the train statistics of the two roads is so striking as to be worth presenting:

	Central.	Erie.
Passenger train load.....	60	41
" average haul, miles.....	32	27½
" expenses per train mile.....	\$0.81	\$0.72
" earnings " " ".....	\$1.20	\$0.92
Freight train load, tons.....	193	275
" average haul, miles.....	185	157
" expenses per train mile.....	\$1.09	\$1.24
" earnings " " ".....	\$1.51	\$1.89

It appears from this table that the Central runs its passenger trains nearly 50 per cent. fuller than the Erie, while in freight this relation is exactly reversed. On the other hand, the Central has a distinct advantage over the Erie in length of haul for freight and passengers both.

The gross earnings for every month of the year show an increase over those for the corresponding month of the previous year. It is a very remarkable fact that the months of February and March, just before the Interstate Commerce Law went into effect, showed some of the smallest gains, while that for the month of April was much larger. It would be interesting if we had tonnage statistics for the corresponding months, and could know whether the road was really crowding itself with unremunerative traffic, or whether the supposed pressure of shipments of that time was less than it appeared to be.

The gross earnings for the year were \$35,297,000, against \$30,506,000 for 1885-86, or an increase of about 16 per cent. It should be remembered, however, that the earnings of the West Shore were only included during nine months of the previous year. The increase in passenger and ton mileage was only 11 and 12 per cent. respectively. The difference between the two sets of figures is not wholly due to higher or better maintained rates, but to the large relative increase of way business and of profitable traffic. While the tonnage of grain remained nearly stationary, almost everything else showed a decided increase. We have already alluded to the large increase in operating expenses. It is more than in propor-

tion to the increase in earnings; but as half of it is on maintenance account, it simply indicates conservative finance, and not wasteful operation. And in spite of all these attempts to swell the current charges for the sake of keeping the capital amount down, the resulting surplus, after payment of dividends, \$1,570,000, or nearly 50 per cent. greater than last year.

November Accidents.

Our record of train accidents in November, given in this number, includes 73 collisions, 48 derailments and 4 other accidents; a total of 125 accidents, in which 43 persons were killed and 105 injured.

These accidents are classified as follows:

COLLISIONS:	
Rear.....	52
Butting.....	19
Crossing.....	2
	73
DERAILMENTS:	
Broken rail.....	1
Loose rail.....	1
Broken bridge.....	2
Broken wheel.....	3
Broken axle.....	4
Broken draw-bar.....	1
Misplaced switch.....	5
Rail out for repairs.....	2
Open draw.....	1
Train left without men aboard.....	2
Cattle on track.....	2
Landslide.....	1
Purposely misplaced switch.....	1
Malicious obstruction.....	2
Unforeseen obstruction.....	2
Unexplained.....	19
	48
OTHER ACCIDENTS:	
Cars burned while running.....	1
Boiler explosion.....	2
Cylinder explosion.....	1
	4

Total number of accidents..... 125

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing.	Total.
Trains breaking in two.....	9	..	..	9
Misplaced switch.....	4	..	..	4
Failure to give or observe signals.....	3	..	..	3
Mistake in giving or understanding orders.....	..	1	..	1
Miscellaneous.....	2	..	..	2
Unexplained.....	34	18	2	54
Total.....	52	19	2	73

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road.....	..	4	..	4	4
Defects of equipment.....	9	7	4	20	16
Negligence in operating.....	10	10	..	20	16
Unforeseen obstructions.....	..	8	..	8	6
Unexplained.....	54	19	..	73	58
Total.....	73	48	4	125	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger.....	25	10	1	36	29
Freight and other.....	108	38	3	149	81
Total.....	133	48	4	185	100

The casualties may be divided as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
KILLED:					
Employees.....	23	11	4	38	88
Passengers.....	..	..	..	..	10
Others.....	1	..	..	1	2
Total.....	24	11	4	43	100
INJURED:					
Employees.....	65	19	3	87	83
Passengers.....	3	1	..	4	4
Others.....	9	4	1	14	13
Total.....	77	24	4	105	100

Twenty-eight accidents caused the death of one or more persons, and 25 caused injury but not death, leaving 72 (58 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with November, 1886, shows:

	1887.	1886.
Rear collisions.....	52	38
Butting ".....	19	20
Crossing ".....	2	5
Derailments.....	48	50
Other accidents.....	4	8
Total.....	125	130
Employees killed.....	38	28
Others ".....	5	5
Employees injured.....	87	49
Others ".....	18	57
Pass. trains involved.....	36	40

Average per day:

Accidents.....	4.17	4.33
Killed.....	1.43	1.10
Injured.....	3.50	3.53

Average per accident:

Killed.....	0.344	0.254
Injured.....	0.840	0.815

Rear collisions show the most noticeable figures for the month; 87 per cent. increase over the record of a year ago, considered in connection with the large number which the *Railroad Gazette* never hears of, but which every one knows are constantly occurring, furnishes ample food for reflection. Evidently we cannot expect to go on increasing mileage at a rapid rate and still keep the accident figures stationary, without a big change somewhere. The large number of employees killed and injured during the past year may be traced in some degree directly to the new construction which is so actively going on, for many of the sufferers were workmen on construction trains, which often appear to be recklessly run. It might perhaps be more just to call these laborers "passengers," as strictly speaking they are not trainmen; but the way their safety is guarded often indicates that they are deemed anything but passengers.

Of the collisions classed as resulting from trains breaking in two a portion were undoubtedly the result of carelessness, and of the rear collisions set down as unexplained, probably four-fifths were from failure to give or observe a proper signal. When a half dozen cars break from the rear of a train on an ascending grade and run back into a following train it is plain that if the brakes were fair and the men

were awake there must have been some rank blundering. Cases of this kind should not be settled by merely discharging the men for being asleep, or on any similar pretext; they occur so frequently that they should be made the ground of a searching examination of the whole force of trainmen. When cars which are once brought to a standstill (as they must have been in these cases) there is a big fault in the track, cars or men if they cannot be kept at a standstill. The list of collisions also includes three which occurred in fog and one attributed to the influence of a forest fire, which made such a smoke that the view was not good; but it is, of course, absurd to lay the blame on these circumstances, when the trainmen have doubtless been familiar with fogs ever since they cut their eye-teeth. Two collisions in this list were cases of wrecking trains running into the rear of passenger trains; a commentary on our methods of doing things that would be ridiculous if it were not so often tragic; the maxim about remedies that are worse than the disease may almost be applied here. There appear to be only two cases of passengers killed in the cars; in one of these, the passenger, who was in a certain sense an employé, jumped on a train before it had come to a stop. Several accidents are reported in such meagre fashion that the state of the sufferers cannot be determined. Among employés killed are five who were in a freight caboose and may have been passengers or trespassers.

There were no accidents to passenger trains from defects of road or equipment. The one open draw was in Canada, and the bridge seems to have had very inadequate signals. The newspaper report says the runner, who was killed, doubtless "miscalculated the distance between himself and the draw." One collision was at Wollaston, Mass., where on Oct. 8, 1878, an accident from a very similar cause occurred, killing 19 people. Lightning evidently will abandon its old habit of striking only once in a place unless the railroads of the country mend their ways.

The derailment on the Sixth avenue line of the Manhattan elevated road (New York City), Dec. 20, when a slowly moving train was derailed at a point where track repairs were in progress, seems to have been a proof of the efficiency of the safety appliances with which the road is furnished rather than an indication of a dangerous condition, as the city press would seem to desire to show. The accident occurred at a point where a new cross-over track was being put in, and was caused apparently by insufficient spiking of a newly laid rail. Readers of the *Railroad Gazette* will recall the interesting account lately published of the methods in use in the track department of this road; how, in renewing rails, advantage is taken of the wooden guard timbers to block rails in position when it is impossible (as it generally is) to drive all the spikes before a train drives the men off the work. Apparently there was a lack of vigilance in this matter, allowing the rail to turn over while the engine was upon it. But the train was moving slowly and stopped within about one car length. At switches it is of course impossible to preserve perfect continuity of the guard timbers, but it would appear that the timbers were removed or discontinued only over such portion as was absolutely necessary, and that they actually served to keep the wheels in line. Although the least disturbance of a train on the elevated structure necessarily alarms all the passengers, the public cannot be said to have any new or unusual grounds for apprehension. All railroads are haunted by possibilities of danger to a certain degree, but it can safely be said that science and intelligent, systematic vigilance have done as much for the elevated as for any road in the country. The ablest experts have pronounced the structure safe, and the discipline of the men in all departments is as high as that of any road in the country. In many respects the management has few if any equals.

The *American Manufacturer* gives the following tabulated statement of the condition of the blast furnaces of the country on December 1st:

	In blast.		Out of blast.	
Fuel	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal.....	83	13,104	101	11,568
Anthracite.....	120	35,361	80	20,042
Bituminous.....	148	93,295	65	27,509
Total.....	341	141,760	246	59,119

As compared with Nov. 1 there is a total of 12 less furnaces in blast with a weekly capacity of 4,087 tons less. The changes by fuels used are as follows: There are 7 less charcoal furnaces in blast, with 1,041 tons less weekly capacity; 5 less anthracite, with 1,359 tons less weekly capacity, and the same number of bituminous furnaces, but owing to changes in the furnaces in blast the weekly capacity is reduced 1,687 tons.

Measured by capacity there is, as compared with a year ago, an increased production of about 11 per cent. of charcoal iron, 9 per cent. of anthracite, and 18 per cent. of bituminous iron. The returns for the last month, combined with those for the preceding months of the year, furnish a basis for an estimate of the production of 1887, which the editor of the *Manufacturer* puts at 6,288,598 gross tons, an increase of between 10 and 11 per cent. on that of 1886, which showed an advance of 40 per cent. on the make of 1885, or in that year our make was 4,044,526 tons, giving an estimated increase for the two years of 2,244,072 gross tons, which is a greater quantity than we made any year before 1878, when we made 2,301,213 tons.

If it had not been for the coke and anthracite strikes the make of this year would have been much larger, and the present scarcity of cars for the coke trade, which is so great that the Pennsylvania road has lately been running the cars of the North Chicago Rolling Mill Company from Connellsville to Chicago in special trains, returning them by the same

prompt and speedy process, has caused the early closing down of some furnaces for repairs, through the difficulty of getting fuel. There will probably be a small stock of pig iron carried over, and the ore at the lake ports is sold very closely. The estimates for the next year's mining in the Lake Superior mines is from 5,500,000 to 6,000,000 tons. Mr. John Birkinbine, in a lecture delivered before the Franklin Institute, estimates the consumption of iron ores in this country for 1887 at 13,000,000 gross tons. The total outputs of the various mining districts since the beginning of the development is given in gross tons as: Marquette district, 25,000,000; Menominee district, 7,500,000; Gogebic, 2,000,000; Vermillion district, 1,000,000. Total Lake Superior, 35,500,000 tons; Lake Champlain district, N. Y., 13,500,000 tons; New Jersey magnetites, 14,500,000; Cornwall ore, Pa., 8,700,000; Iron Mountain & Pilot Knob, Mo., 4,000,000.

In the 26th annual report of the Maine Central the president calls attention to the fact that about 84 per cent. of the increase in gross earnings was in the passenger traffic. This he attributes mainly to the uncertainty which was felt for some time as to the right of the company under the Interstate Act to reduce rates to compete with the water routes. While this uncertainty lasted much freight was diverted to the water routes, but at the end of the fiscal year it had largely returned to the railroad.

The expenditures for permanent improvements were about \$100,000 more than last year, and all such expenditures have been charged to operating expenses, except the cost of land, shops and certain double track. Like many other roads, the Maine Central has done a great deal of work the last year in replacing wooden bridges with iron. This year of general prosperity must result not only in an unequalled amount of new line built, but in an unprecedented improvement of the old lines.

A loco motive possessing several unusual features has been recently built by the Hinkley Locomotive Co., of Boston. The engine is designed to run fast passenger trains, and has a single pair of drivers, 67 in. diameter on tread, and a pair of 42 in. trailing wheels with radial motion. The front end of the engine is carried on a four wheel truck as usual. The engine has piston valves, but the most novel feature is the form of the tread of the driving wheels. The circumference of the tire, instead of being a true circle, is polygonal, and formed of 105 flats each about 2 in. long. The object is to prevent slipping. The engine has not yet been tried, but it is claimed that polygonal tires have been running on a four-coupled engine on the Boston & Lowell during the last year with satisfactory results.

A flat wheel is generally regarded as damaging to the rails, while the motion of an engine or car with flat wheels is exceedingly unpleasant. Whether any extra adhesion will be gained seems doubtful, but even this means of preventing slipping would certainly, according to all preconceived notions, be more objectionable than the use of sand. However, such a bold departure from time-honored practice deserves a fair trial, and should not be condemned till actual experiment has demonstrated that flat wheels have no redeeming feature.

The Chicago, Burlington & Quincy has quickened its Chicago-Kansas City train service, one train now leaving Chicago at 5:30 p. m., and reaching Kansas City the next morning. It is said the other lines will take similar action Dec. 25.

NEW PUBLICATIONS.

Freight Rates from Pittsburgh and Allegheny City is the title of a periodical published by R. J. Bailey, of Pittsburgh, Pa. It purports to be published "monthly, when rates are changed," and the aim is to give shippers in one volume all the information that they may need about freight rates on any or all the half-dozen roads leading from the city. The purpose is a laudable one; the publications of a number of different roads, of all shapes and sizes, and compiled on a great variety of plans, clutter an office considerably, and where roads are slow or careless about sending out new issues promptly, they are of little value; but whether Mr. Bailey can keep his publication up to date and inspire his subscribers with the confidence that will lead them to use it as they would an official tariff is another question. He asks \$5 a year for it and proposes to promptly notify subscribers of changes in rates between issues. He has, however, already violated what should be a cardinal principle—the gathering of everything between two covers—by referring readers to a previous number for the official classification. The index of stations is one of the most valuable features of the book, as half the work in computing a freight price often consists in finding out the location of the destination and what road the goods should be sent over. There are some good railroad maps to aid the user of the work.

Western Railway Club.

The December meeting of the Western Railway Club was held Wednesday, Dec. 21, at the Grand Pacific Hotel, Chicago. The attendance was large, a delegation of wheel manufacturers constituting a good portion of the audience. President Lauder and Secretary Curtis, of the New England Club, were also present. President Rhodes presided.

CONTINUOUS STEAM HEATING.

The Committee on uniform Couplers for Steam Heating presented as its report a summary of the proceedings of the meeting held at Buffalo, Nov. 30. The report was approved and the same committee, consisting of William Forsyth C., B. & Q.), N. Barr (C., M. & St. P.) and C. A. Schroyer

(C. & N. W.) was empowered to represent the Western Club at the meeting in New York, Dec. 20.

The opening paper was a review of the various systems for heating cars by steam from the locomotive, read by Willard A. Smith, of Chicago. He took up the 15 leading systems. He said that the idea was by no means novel, and could be traced back as far as 1843. In Europe the idea was contemporary with the birth of the railroad, and to-day the plan is in successful operation on some roads there. The speaker said it was astonishing to notice how rapidly all the heretofore insurmountable objections disappeared after the disasters of Rio, Koutz, etc., and all opposition had been silenced by public sentiment. The question now is not whether the method is practicable, but which of the many systems offered is best for the peculiar conditions of each road. The work of equipping trains has gone on so rapidly that statistics of to-day are worthless to-morrow. Information just sent to Congress by the Secretary of the Treasury is ancient history already. In addition to the consideration of safety and economy it is now evident that steam heating is an important attraction for passenger traffic, a fact tending to hasten its general adoption. He would not express an opinion as to the comparative merits of the systems under discussion. Some of them have only one original feature, while others are complete in themselves. The scientific aspects of the question as relating to safety, feasibility and economy seem to be well settled.

DISCUSSION.

Messrs. Rhodes (C., B. & Q.), Verbruyck (C., R. I. & P.), Sinclair (*National Car and Locomotive Builder*), Bryan (Burlington & Northern), Mead (Texas & Pacific), Bushnell (B., C. R. & N.), Cook, Lauder (Old Colony), and Gibbs (C., M. & St. P.), participated in the discussion.

Mr. BUSHNELL exhibited a coupler original with his road, an ordinary ball and socket joint. It has given satisfaction thus far, but the weather has not been severe for a perfect test.

Mr. LAUDER said that there was more doing in Massachusetts than in any other state because of the law against ordinary car stoves. There were several hundred cars heated by steam running into Boston, but he had grave doubts of the success of continuous heating. It was not a question of mechanics, because we know we can heat a train of 12 cars by superfluous steam in ordinary weather. Eastern roads, where the system has been longest tried, can see the most objections, but the circumstances there are entirely different from those in the West. The Boston & Albany, however, has taken the lead, and with the exception of leaky couplings, is doing well. He advocates a hose coupling for steam heating.

Mr. GIBBS said that his company (Chicago, Milwaukee & St. Paul) has adopted a system original with him, and the only objection which had arisen is the difficulty of educating trainmen to regulate the steam. The rubber hose would last a year. Their train thus equipped leaves the Chicago depot at 7:30 every evening and is open to inspection. In this service they have 17 cars, and a proportionate number of engines equipped. At terminal points boilers are maintained so that trains standing without locomotives can be kept warm. They had encountered very severe weather, though not enough of it for a thorough test, but it was in his opinion no longer a question for the mechanical but for the operating department.

SPECIFICATIONS FOR CAST-IRON WHEELS AND THEIR WEAR COMPARED WITH STEEL-TIRED WHEELS.

This subject was introduced by Mr. Barr (C., M. & St. P.). After giving his idea of a perfect wheel he concluded: It now remains to modify the ideal specifications so that, with the use of good material and proper foundry manipulation, the wheel maker can be reasonably expected to comply with them. It is believed that these specifications meet the conditions in practice, that any reputable wheel maker will be perfectly willing to comply with them, and if faithfully complied with, that wheel users will be practically free from broken wheels and will, at the same time, obtain from the wheels a much more satisfactory mileage than is the average at present.

Specifications.

(1.) The chills in which the wheels are cast must be of the same diameter, and the same chill must not vary at different points more than one thirty-second of an inch in diameter. (2.) Wheels must not vary more than one-quarter of an inch above or below the mean, measured on the circumference, and the same wheel must not vary in diameter more than one thirty-second of an inch. The body of the wheel must be smooth and free from shrinkage, slag, or blowholes. The tread must be free from deep and irregular wrinkles, and from small wrinkles more than twenty inches long. No wheels having wrinkles in the throat will be accepted. The tread must be free from sand or slag; if the sweat or beads in the throat are one-eighth of an inch or over in diameter, or the clusters of sweat are more than 6 in. in length, the wheel will not be accepted. No chill cracked wheel will be accepted.

(3.) The wheels broken must show clean, gray iron, free from holes containing dirt or slag more than one-quarter inch in diameter, or clusters of such holes. The depth of clear, white iron must not exceed seven-eighths inch or be less than three-eighths inch in the middle of the tread and must not be more than one-quarter inch less than these figures in the throat. The depth of white iron must not vary more than one-quarter inch around the tread on the same wheel.

(4.) Wheels must be of such strength that a 550-lb. wheel will require 30 blows, and a 575-lb. wheel will require 50 blows of a 100-lb. drop, falling 7 ft. upon the outside of

plate close to the rim to break a piece out, the rim of wheel resting on a cast-iron ring weighing 1,000 lbs.

(5.) The weight of wheels for freight service must be 550 lbs., and for passenger service must be 575 lbs.

In the discussion President Rhodes, Mr. Lauder, Mr. Verbruyck, Mr. Bushnell and Mr. Cooke participated.

An informal discussion was then had on the question of "Axles for 60,000-lb. cars," but as the committee on that subject was not ready with its recommendation, it was laid over till the next meeting, when it will be the leading topic.

Train Accidents in November.

COLLISIONS.

REAR.

1st, on Central Vermont, near Bartonville, Vt., a freight train broke in two, and rear section ran into forward one, damaging 2 cars.

2d, on Illinois Central, at Champaign, Ill., a passenger train ran into a freight car which was standing partially on the main track, doing some damage and injuring a trainman.

2d, on Union Pacific, near Papillion, Neb., a freight train into a preceding freight, wrecking an engine and several cars.

2d, on Baltimore & Ohio, near Washington, Pa., a freight train broke in two and while the trainmen endeavored to recouple the detached portion, a following freight train crashed into it; engine and several cars wrecked; 1 trainman killed.

3d, on St. Louis Bridge & Tunnel road, in St. Louis, Mo., a circus train which had been derailed was run into by an engine; 1 man killed and several injured. Quite a number of wild beasts were liberated and created consternation in a large section of the city for two hours.

4th, on Lake Shore & Michigan Southern, near Unionville, O., a freight train broke in two and rear section ran into forward one, wrecking several cars.

4th, on Chicago, Santa Fe & California, near La Plata, Mo., a tie train ran into some platform cars, which were set in motion by the collision and ran down grade to the end of the track and plunged off a high trestle, completely wrecking them.

4th, on Old Colony, at Wollaston, Mass., a freight train ran into a switching freight train, wrecking an engine and 6 cars.

5th, on Burlington & Missouri River, at Brenner, Kan., a passenger train ran into a freight train standing on the main track, wrecking the engine and telescoping the caboose; 1 laborer killed and 4 injured.

7th, on St. Paul, Minneapolis & Manitoba, at Saco, Mont., a freight train ran into the rear of a stock train, damaging several cars and killing a man in the caboose.

7th, on Pennsylvania, at Wall Station, Pa., a freight train into a preceding freight, which had stopped and sent back no flag, damaging the engine and several cars.

7th, evening, on New York, Lake Erie & Western, at Secaucus, N. J., an empty engine ran into the rear of a passenger train just as the latter was about to stop at the station. The rear car was badly crushed, and a passenger, who had just jumped on the rear end of the last car, was killed and another injured. The passenger train had stopped for a draw-bridge about 100 rods back, and at that time sent out a flagman, who stopped the empty engine. The collision would therefore seem to have been due to lack of ordinary caution on the part of the runner of the empty engine. Secaucus is a flag station for this train.

9th, on Lehigh Valley, at Lost Creek, Pa., a wrecking train ran into the rear of a passenger train, damaging the engine and one car.

9th, on Baltimore & Ohio, near Black Hand, O., a freight train ran into the rear of another freight, wrecking a large number of cars.

10th, on Western & Atlantic, near Dalton, Ga., a freight train into a preceding freight, doing considerable damage.

10th, on Elgin & Pere Marquette, near Highland Station, Mich., a freight train broke in two and the rear section ran back into a following passenger train, damaging the engine and throwing the caboose down an embankment, injuring a trainman.

10th, on Southwestern, near Power's, Ga., a freight train ran into a preceding passenger train, wrecking the engine and rear car; 1 passenger killed and 1 fatally injured.

10th, on Connecticut River road, at South Deerfield, Mass., passenger train ran over misplaced switch and into some freight cars standing on a side track, damaging the engine and derailling several cars.

11th, on Boston & Albany, in the yards at East Albany, N. Y., a freight train ran into the rear of another freight train, wrecking an engine and several cars.

11th, on Minnesota & Northwestern, near La Monte, Ia., a freight train broke in two and rear section ran into forward one, wrecking several cars; 1 trainman killed and 1 injured.

11th, on New York Central & Hudson River, at Newark, N. Y., a freight train into a preceding freight, damaging the engine and several cars.

12th, on Pennsylvania, at Houtonville, N. J., a Lehigh Valley freight train broke in two and rear section ran into forward one, wrecking several cars and blocking three main tracks.

13th, on St. Paul, Minneapolis & Manitoba, near Glyndon, Minn., a freight train ran into the rear of a preceding freight, doing considerable damage. Five men in the caboose killed.

15th, on Delaware & Hudson Canal Co.'s road, in Schoharie Junction, N. Y., a freight train ran over a misplaced switch and into some cars standing on a siding; engine and 6 cars damaged; two trainmen slightly injured.

15th, on Terre Haute & Indianapolis, at Seelyville, Ind., a freight train ran into the rear of a preceding freight and the engine and several cars were piled up in a bad wreck, which took fire and was totally destroyed.

15th, on New York, Lake Erie & Western, near Suffern, N. Y., a freight train broke in two and rear section ran into the forward one, 24 cars being completely wrecked. A brakeman was caught in the wreck and fatally injured.

15th, on Burlington & Missouri River, in the yard in Lincoln, Neb., a passenger train colliding with some freight cars which were being pushed on to the main track by a switch engine, doing considerable damage.

15th, on Fitchburg road, at Buskirk, N. Y., freight train into the rear of a preceding freight, injuring a fireman.

15th, on Pennsylvania, near Birmingham, Pa., a train going to a wreck ran into the rear of a passenger train, doing some damage.

15th, on Delaware, Lackawanna & Western, at Lisle, N. Y., a coal train ran into a preceding coal train, doing some damage.

18th, on Delaware & Hudson Canal Co.'s road, at Dickson, Pa., some cars which had got away from a switching freight at Olyphant, the next station, and run back down grade, ran into the head of a freight train, damaging the engine and several cars.

19th, on Pennsylvania, near White Hill, N. J., a passen-

ger train ran into the rear of a coal train, damaging the engine and several cars.

19th, on Norwich & Worcester, in Mechanicville, Conn., a freight train ascending a grade broke into three parts and the second section ran back down grade and collided with the last section, wrecking 3 cars.

20th, on St. Louis, Iron Mountain & Southern, near Gurdon, Ark., a pay train ran into a preceding freight train, damaging the engines and caboose; 1 trainman injured.

21st, on New York, Chicago & St. Louis, in Cleveland, O., a freight train ran into a preceding freight, wrecking engine and caboose.

21st, on Fall Brook Coal Co.'s road, near Mullhollans, N. Y., a freight train ran into a preceding freight at a curve, wrecking the engine, caboose and several cars; a trainman injured. The caboose caught fire and burned up.

22d, on Pennsylvania, at Point Breeze, O., an engine ran over a misplaced switch and into some freight cars standing on a siding, doing considerable damage; 1 trainman fatally and another slightly injured.

22d, on Chicago & Atlantic, at Aldine, Ind., a freight train ran into a preceding freight which had stopped to do some switching, wrecking an engine, 6 cars and a caboose. The wreck caught fire, and was partially consumed.

22d, on Chicago & Alton, near Sherman, Ill., a heavy freight train drawn by two engines ran into the rear of another freight, which had stopped to take water, making a bad wreck, which caught fire; 18 cars were burned up.

22d, on Pennsylvania, in Philadelphia, Pa., a freight train ran over a misplaced switch and into some cars standing on a siding, doing some damage; 1 trainman injured.

22d, on Chicago, Milwaukee & St. Paul, at Ixonia, Wis., a passenger train ran into the rear of a freight engine, caboose and 5 freight cars wrecked; a trainman injured.

24th, on Cincinnati, Hamilton & Dayton, at Anna, O., during a heavy fog, a freight train ran into the rear of another freight, wrecking the engine and 20 cars, and killing a trainman.

25th, on Chicago, Milwaukee & St. Paul, near Dedham, Ia., a freight train broke in two and the rear section ran into the forward one, wrecking 12 cars and injuring a trainman.

26th, on Lake Shore & Michigan Southern, a freight train which had stopped to take on a working car was run into by a following freight train, and the engine and 17 cars were piled up in a bad wreck; 5 laborers injured.

26th, on Atlantic and Pacific, at Fairview, A. T., a freight train ran into a preceding freight, damaging the engine and several cars.

26th, on Boston & Albany, near South Spencer, Mass., an empty engine ran into the rear of a freight train, doing some damage. There was a dense fog at the time.

27th, on New York, Lake Erie and Western, near Callicoon, N. Y., a freight train broke in two and the rear section ran back into a following freight, wrecking the engine, caboose and 7 cars.

27th, on Northern Central, at Goldsboro, Pa., a passenger train ran into the rear of a freight train, derailling the engine and 8 cars, all of which were thrown down an embankment. Fireman slightly injured by jumping.

30th, on New York, New Haven & Hartford, in Bridgeport, Ct., a freight train ran into the rear of a preceding freight, wrecking the engine and several cars.

30th, on Fitchburg road, in Fitchburg, Mass., a special passenger train, consisting of 6 Pullman sleepers and a baggage car, ran into the rear of a freight train which was pulling into a siding at the freight-yard east of the station, wrecking the engine, caboose and several cars; fireman and a drover in the caboose injured. A car loaded with oil took fire and the wreck was partially consumed. It is said the freight did not properly protect itself, and also that the air-brakes on the passenger cars were inefficient; but the Massachusetts Railroad Commissioners blame the engineman of the passenger, and also say that the fixed signals were insufficient and the rules regarding them ambiguous.

30th, on Montana Union, near Silver Bow, Mont., a freight train ran into the rear of a passenger train, which had been brought to a sudden stop owing to a freight train preceding it having broken in two, and the engine crushed the rear car.

While the wreck was being cleared up another freight train came along and damaged the caboose of the last train.

BUTTING.

2d, on Cincinnati Southern, near Lansing, Tenn., butting collision between a passenger train and a freight, wrecking the engines and several cars.

4th, on Canadian Pacific, near Rat Portage, Man., butting collision between two freight trains, making a bad wreck; 4 trainmen injured 2 of them fatally.

5th, on Central of Georgia, near Atlanta, Ga., a butting collision between two freights piled up the engines and quite a number of cars in a bad wreck.

15th, on Grand Trunk, at Renton, Ont., a freight train broke in two while going into a siding and the detached portion was run into by a freight bound in the opposite direction, wrecking an engine and 13 cars; 2 trainmen and a man in the caboose injured.

16th, on Chicago & Northwestern, at Nachusa, Ill., butting collision between two freights, wrecking the engines and 16 cars.

16th, on St. Louis, Iron Mountain & Southern, near Bradford, Ark., butting collision between two passenger trains, wrecking the engines and several cars; 5 trainmen injured. There was a dense smoke at the time, owing to extensive forest fires prevailing in that region.

16th, on Baltimore & Ohio, in Newark, O., butting collision between two freights wrecked both engines and several cars. A dense fog prevailed at the time.

17th, on Pittsburgh, Cincinnati & St. Louis, at Nobles-town, Pa., butting collision between a passenger train and a freight, damaging the engines; a trainman and a passenger slightly injured.

18th, on Gulf, Colorado & Santa Fe, at Alvin Junction, Tex., butting collision between a passenger train and a water train, wrecking the engines and several cars; 2 trainmen killed and 4 injured. The wreck caught fire and the baggage and express cars were consumed with all their contents.

20th, on Arkansas Midland, near Helena, Ark., butting collision between a passenger train and a freight wrecked the engines and several freight cars.

20th, on Cairo, Vincennes & Chicago, near Tunnel Hill, Ill., a butting collision between two freight trains wrecked the engines and several cars, killing 4 trainmen.

22d, on Central Pacific, near Pile, Cal., butting collision between two passenger trains, badly wrecking both engines and the baggage cars in each train; 2 trainmen injured.

23d, on Cincinnati, New Orleans & Texas Pacific, at Nemo, Tenn., butting collision between two freights, wrecking the engines and 7 cars; 1 trainman killed and 3 injured, one of them fatally.

25th, on Atlantic & Pacific, near Williams, A. T., butting collision between a passenger train and a work train, doing considerable damage; 3 men killed and 18 injured.

25th, on Baltimore & Ohio, at a curve near Cochran's Mills, Pa., a butting collision between two freights completely wrecked the engines and most of the cars of both trains; 3 trainmen killed and 5 injured. It is said that an operator forgot to deliver an order.

26th, on Philadelphia & Reading, on a bridge over Susque-

hanna Canal, near Milton, Pa., butting collision between two freights, throwing engines and several cars from the bridge into the canal, making a bad wreck.

28th, on Delaware & Hudson Canal Co.'s road, in Saratoga, N. Y., butting collision between two freight trains.

29th, on Missouri Pacific, at Osage, Kan., butting collision between two passenger trains.

30th, on Kanawha & Ohio, near Plymouth, W. Va., butting collision between two freights, doing considerable damage.

CROSSING.

7th, a New York, Chicago & St. Louis freight ran into a Terre Haute & Indianapolis freight at the crossing in Hibbard, Ind., injuring a trainman.

7th, in Selma, Ala., a Western Alabama freight collided with an East Tennessee, Virginia & Georgia freight, damaging the engines and fatally injuring a trainman.

DERAILMENTS.

DEFECTS OF ROAD.

13th, on Ohio Southern, near Greenfield, O., a bridge gave way under a passing freight and the engine and 8 cars went down into a creek and were completely wrecked; 1 trainman fatally and another seriously injured.

14th, on Southern Pacific, near Savannah, Cal., several cars of a freight train were thrown off the track by a loose rail and damaged.

18th, on Newport News & Mississippi Valley, near Paducah, Ky., a high trestle, which had caught fire and was partially burned, gave way under a passing freight, and the entire train tumbled into the creek and was completely wrecked; 2 trainmen killed and 3 injured.

18th, on New York, Rutland & Montreal, near Lebanon Springs, N. Y., engine and 4 cars of a freight derailed by a broken rail. The engine upset and the cars went over an embankment, injuring a trainman.

DEFECTS OF EQUIPMENT.

1st, on Illinois Central, near Cobden, Ill., 8 cars of a freight train derailed by the breaking of a wheel.

6th, on Pennsylvania, at Conemaugh, Pa., 5 cars of a freight train wrecked by the breaking of an axle.

9th, on Central Pacific, at Towles, Cal., 6 cars of a freight derailed and wrecked by the breaking of a wheel.

10th, on Western & Atlantic, near Dalton, Ga., 6 cars of a freight derailed by a broken axle and wrecked.

16th, on Western New York & Pennsylvania, near Silver Creek, N. Y., a draw bar in a freight train was pulled out as the train neared a high trestle; 2 cars were derailed and tipped off the trestle and several others jumped the track after crossing it. The adjoining track of the New York, Chicago & St. Louis was blocked.

23d, on Philadelphia, Wilmington & Baltimore, near Eddystone, Pa., 5 cars of a freight train derailed and wrecked by the breaking of an axle.

28th, on Maine Central, near Bangor, Me., 6 cars of a freight train derailed by the breaking of an axle.

NEGLIGENCE IN OPERATING.

1st, on New York, Lake Erie & Western, in Jersey City, N. J., owing to a misplaced switch a passenger train was derailed, and demolished an adjoining building.

2d, on Terre Haute & Indianapolis, near Auburn, Ill., several cars of a gravel train derailed at a point where section-men had removed a rail for repairs.

5th, on Southern Pacific, near Peach Springs, Ari., a passenger train ran over a misplaced switch and was derailed, wrecking the engine and 2 baggage cars, killing the engineer and a machinist who was riding on the engine.

7th, on Central of New Jersey, at Tamaqua, Pa., a freight train broke in two and rear section ran back down grade for some distance, when the cars jumped the track, demolishing an adjoining building.

7th, on Pittsburgh, Cincinnati & St. Lewis, near Wheeling, W. Va., 8 cars of a freight train derailed at a point where track repairs were in progress, knocking down an adjoining building and injuring 3 occupants.

9th, on Boston & Maine, in Nashua, N. H., engine and several cars of a freight train derailed by a misplaced switch.

16th, on Cleveland, Akron & Columbus, at Gallon, O., passenger train derailed by a misplaced switch.

19th, on Atchison, Topeka & Santa Fe, at Lemont, Ill., passenger train derailed by a misplaced switch.

20th, on Canadian Pacific, near Montreal, Que., a freight train, consisting of an engine and 4 cars, went through an open draw into the Lachine Canal; 1 trainman killed and 3 injured. There was a heavy fog at the time.

26th, on Oregon Division of the Southern Pacific, near Siskiyou, Cal., a construction train, which was standing on a grade and held by air-brakes, started down grade, the air having leaked out. All the trainmen were on the ground. The engineman started a few minutes after the train, but failed to get on, and the whole train, engine, tender and 6 cars, went at a rapid rate until it reached a curve, where the whole went over a bank.

UNFORESEEN OBSTRUCTIONS.

6th, on New York Central & Hudson River, at Crittenden, N. Y., engine and 8 cars of a freight derailed by a tie which had been fastened across the track.

7th, on Charlotte, Columbia & Augusta, near Hudsonville, N. C., engine of a passenger train derailed by ties which had been placed on the track by train wreckers.

7th, on Central Pacific, near Proberta, Cal., a loose steel rail lying on the ties struck the baggage car of a passenger train, throwing it and the following cars off the track.

8th, on Michigan Central, near Hammond, Ind., a freight train ran over a purposely misplaced switch and into some cars standing on a siding, piling up the engine and 15 cars in a bad wreck.

18th, on Northern Pacific, near Thompson Falls, Mont., a freight train ran into a herd of cattle and the engine and 10 cars were derailed and wrecked; a trainman slightly injured.

19th, on Baltimore & Ohio, near Tunnelton, W. Va., passenger train derailed by a freight car door, which had fallen upon the track from a passing train, badly damaging the engine; engineer and fireman scalded by escaping steam, the former fatally.

20th, on Cleveland & Pittsburgh, near Stubenville, O., a construction train ran into a landslide in a deep cut, the engine being overturned and 2 cars piled on top of it; 2 trainmen killed and a third fatally injured.

24th, on Dayton, Ft. Wayne & Chicago, near Xenia, O., a freight train ran over a cow, and several cars were derailed; 1 trainman injured.

UNEXPLAINED.

1st, on Grand Trunk, at Chesley, Ont., freight train derailed and several cars wrecked.

3d, on Kentucky Central, near Hutchinson, Ky., freight train derailed.

3d, on St. Louis Bridge and Tunnel road, in St. Louis, Mo., a circus train derailed.

4th, on Terre Haute & Indianapolis, near Gloverland, Ind., 4 cars of a circus train derailed and wrecked. The wreck caught fire and was consumed.

5th, on Southwestern, near Byron, Ga., passenger train derailed.

7th, on Canadian Pacific, near Fort Arthur, Can., the rear

car of a passenger train was derailed and went over an embankment, where it caught fire and burned up.

10th, on Memphis & Charleston, near Hillsboro, Ala., a freight train derailed and several cars wrecked.

10th, on South Florida, near Dade City, Fla., a freight train derailed.

13th, on Southern Pacific, at a curve near Mojave, Cal., engine of a freight derailed.

15th, on Georgia Midland, in Griffin, Ga., a car in a switching freight train derailed.

15th, on Pennsylvania, near Tyrone, Pa., 16 cars of a freight train were derailed and wrecked at a cross-over switch.

18th, on Missouri Pacific, near Lyons, Kan., engine of a freight train derailed and rolled down an embankment; 1 trainman killed and another injured.

18th, on Terre Haute & Indianapolis, near Brazil, Ind., engine and one car of a passenger train derailed, killing 1 trainman and seriously injuring another. One car caught fire and was burned up.

18th, on Baltimore & Ohio, in Wheeling, W. Va., a freight train derailed.

19th, on Central of New Jersey, near Bangor, Pa., a pay car was derailed and thrown over an embankment and wrecked; 4 employees injured.

25th, on Dayton & Ironton, near Mt. Vernon Furnace, O., passenger train derailed, 2 cars being overturned; 1 passenger injured.

25th, on Georgia Pacific, near Columbus, Ga., the three last cars of a freight train jumped the track just before reaching a trestle over North River and were thrown off the trestle into the stream; 2 trainmen and a tramp injured.

26th, on Western Atlantic, near Smyrna, Ga., 7 cars of a freight train derailed and wrecked.

26th, on Wabash, near Beaumont, Ill., passenger train derailed, damaging engine.

OTHER ACCIDENTS.

1st, on Atlantic & Pacific, near Chino, Ariz., a freight engine exploded its boiler; 3 trainmen killed.

2d, on Manhattan Elevated, Third Avenue line, near Grand street, New York city, passenger engine blew out a cylinder-head. A man on the sidewalk was injured by falling fragments.

15th, on New York Central & Hudson River, at Palatine Bridge, N. Y., as the engine of a freight train was backing away from a standpipe its boiler exploded with terrific force, killing the fireman and seriously injuring the engineer. A brakeman was blown into the air also, but escaped with slight scratches.

16th, on Missouri Pacific, near Campbell, Tex., several cars in a freight train loaded with cotton became ignited by sparks from the engine and were destroyed; a brakeman was seriously injured in endeavoring to put out the fire.

A summary will be found in another column.

TECHNICAL.

The Car Shops.

The Pittsburgh & Lake Erie has let a contract for 10 passenger, 2 baggage, 100 box and 200 coal cars to the Ohio Falls Car Co.

The Wason Manufacturing Co., of Brightwood, Mass., has received orders for 12 passenger cars from the Old Colony and 6 from the Connecticut River.

The Chicago & Northwestern has let the following contracts: 1,900 freight cars to the Peninsular Car Co., of Michigan; 1,000 to the Terre Haute Car Works, and 1,000 to the Pullman Palace Car Co.

The Allegheny Valley has ordered 150 gondola cars of the Erie Car Works.

Bridge Notes.

The Kansas City Bridge & Iron Co. has been awarded the contract to construct a bridge at Rosedale, Kan., to cost \$33,440.

The contract for the erection of a bridge at Bridgeport, Conn., has been awarded to Dean & Westbrook, of New York, who represent the bridge building company, with works at Phoenixville, Pa. The contract price is \$67,500. The work of building the bridge will be commenced early next spring.

The Southeast Bridge Co., of Pittsburgh, has been chartered. The capital is \$25,000, and the shareholders are B. F. Jones & Co.

The County Commissioners will build a bridge at Tainter, Wis.

The Commissioners will build a bridge over the Catawba River at Camden, S. C.

The County Commissioners will build a bridge at Jackson, N. H.

The Commissioners will build a bridge at Woonsocket, R. I.

The Commissioners will build a bridge across the St. Sebastian at St. Augustine, Fla.

The County Commissioners will build two bridges at Grand Forks, Dak.; cost, \$50,000.

The Commissioners will build a bridge over the Passaic at Newark, N. J.

The New York Central & Hudson River has ordered from Cooper & Hewitt's Iron Works two iron draws for the bridges over the Passaic and the Hackensack Rivers on the Newark branch.

Manufacturing and Business.

The Mason Regulator Co., of Boston, Mass., states that its locomotive valve has been adopted by the following railroads: Pennsylvania, Boston & Albany, Old Colony, Lehigh Valley, Baltimore & Ohio, East Tennessee, Virginia & Georgia, Connecticut River, Burlington, Cedar Rapids & Northern.

The Houston Car Wheel Foundry Co., of Houston, Tex., has been incorporated with a capital of \$50,000. Incorporators: A. D. Banta, George M. and H. H. Dickson.

W. H. Everson and G. H. Everson, of Pittsburgh, Pa.; A. C. Hall, of Denver and J. B. Lott, of Scottsdale, have organized the American Steel Wheel Vehicle Co.; W. H. Everson, President, and G. H. Everson General Manager. The object is to manufacture all kinds of steel wheels for vehicles.

The Standard Machine Co., of Bay City, Mich., will build shops at Chattanooga, Tenn., under the name of the Chattanooga Machine Co.

McCombs, Taylor & Co., of Atlanta, Ga., contemplate moving their machine works to Chattanooga, Tenn., and enlarging their capacity. They will probably organize a stock company.

The Decatur Car Wheel & Car Spring Co. have let the contract to erect their works to Turner & Goodwin. The main building will be 75 by 280 ft.

The contracts for two of the large overhead traveling cranes for the ordnance gun shops at the Navy Yard, Washington, D. C., have been secured by the Morgan Engineering Co., of Alliance, O., and work will be commenced on them at once; one is to be completed in 10 months and the other in 15 months.

The Swindell Construction Co., Pittsburgh, have been awarded a contract by the Standard Manufacturing Co., Allegheny City, to build them a large enameling furnace and also an open-hearth furnace.

The Glendon Iron Wheel Co., of Toledo, O., is building a \$200,000 factory.

The new vestibule train which is to be known as the Jacksonville Limited, running from New York to Jacksonville, Fla., is to be lighted by electricity furnished from storage batteries of the Electrical Accumulator Co. The current is supplied by a dynamo placed in the baggage car and is run by an axle attachment.

Owing to the pressure of orders, the Dayton Manufacturing Co. has been compelled to enlarge its establishment by the addition of a new brass foundry 75 by 100.

Iron and Steel.

The contract for the construction of a Bessemer steel experimental gun for the Navy Department at Washington has been awarded to the Pittsburgh Steel Casting Co., of Pittsburgh. It is stated that should the gun possess the tensile strength required, the government will make a continuous contract for their production.

The North Chicago Rolling Mill Co., Chicago, has just finished an order for steel rails of a peculiar pattern. The rails are 16 ft. 10 in. long, with a grooved or corrugated surface. They are to be used in paving a street in Chicago. The rails, the first order for which is 50 tons, will be laid a few inches apart, and the space between them will be filled with patent composition. The pavement is intended for streets in which there is much heavy teaming.

The force of men in the car-wheel department of the Union Foundry and Car-Wheel Works, at Pullman, has been doubled recently, on account of the constantly increasing orders to be filled.

Adam Wagner, assignee, sold last week by order of Court the Swifts' Iron & Steel Works in Newport, Ky. The real estate, machinery, material and stock sold for \$199,550. It was bought by H. A. Schriver, who is said to represent a company composed of Al Gahr, Adam Wagner, R. V. W. Nelson and others, of Cincinnati. The property belonged to E. L. Harper, who was sentenced to ten years' imprisonment for wrecking the Fidelity Bank in Cincinnati.

The Union Iron Works Co., of Chattanooga, Tenn., have purchased 10 acres of land on which to build new and larger works.

The Western Steel Works are preparing to shut down, owing to lack of orders.

A fire destroyed the nail department building of the Tredgar Iron Works in Chattanooga, Tenn., last week. The building was 60 ft. wide and 300 ft. long.

The Bethlehem (Pa.) Iron Co. has given notice of a general reduction of 10 per cent. in wages, to take effect Jan. 1. This reduction still leaves the wages several per cent. higher than before the advance last winter.

The Lehigh Valley has ordered 15,000 tons of steel rails of the Bethlehem Iron Co., at a price not stated.

The Howard Rolling Mill Co., Limited, have erected and recently put in operation at Howard, Centre County, Pa., a mill for the manufacture of iron and steel wire rods.

The converting, blooming and rail departments of the Edgar Thomson Steel Works, at Braddock, Pa., were closed last week.

The Rail Market.

Steel Rails.—Several transactions have been closed and others are pending. Sales of about 40,000 tons, one being 15,000 tons by the Bethlehem Iron Co. to the Lehigh Valley, another of 12,000 tons to a trunk line, and another of 5,000 tons, all sold by Eastern mills. A lot of 4,000 tons has been sold by a Western mill to a Western road at a low figure. Prices are irregular. Quotation, \$31.50@33.

Old Rails.—Market continues as it has been for a long time, quiet. Still there is some business in promise. A sale of 1,000 tons of ties for the Youngstown district on private terms, and a number of foreign rail sales are reported at Pittsburgh.

Scrap.—Market dull, with foreign scrap at \$19@19.50, and domestic at \$19.50@20.

Railroad Fastenings.—Several orders have been placed recently. Quotations: Spikes, 2.25@2.40c. delivered; angle bars, 1.90@2.10c., and bolts and nuts, 3@3.25c.

Electric-Lighting on Russian Railroad Trains.

A special commission has been appointed in Russia for examining the question of car lighting by electricity and choosing the most available of the systems now known. The intention is to make the electric lighting of passenger cars compulsory on the principal lines of the empire, and experiments have already begun on the Nikolajev Railroad. Independently of this, the Russian Southwest Railroad has already introduced the electric light on the trains between Odessa and Kiev.

Explosive Mine Gases.

Mr. Thomas Shaw gave a lecture on this subject in Pittsburgh, Dec. 16. He was listened to by a large audience of mining engineers, mine owners, superintendents and bosses and others. The lecturer gave tests in the presence of the audience, and showed how extremely unsafe and treacherous the lamp test is for detecting the percentage of dangerous gases present, and how dangerous it is when testing the highly explosive mixtures, although the lamp to-day is the sole test used throughout the mining districts. The lecturer showed also that all these tests are largely guesswork. He indicated a safe and positive test by the use of an instrument invented by himself, which puts a sharp line of demarcation between the dangerous and non-dangerous gases in so simple and exact a manner that the most ignorant can use it with as much exactness as the most skilled.

Magnolia Metal.

The Magnolia anti-friction metal, after several severe tests, has developed very satisfactory results. A number of railroad companies that have tried the metal have been so pleased with its qualities that they have placed large orders and have decided to use it wherever an anti-friction metal is required. The Morgan line of steamers are rapidly placing the metal in all the bearings of their steamships. The introduction of Magnolia has progressed so favorably that the company has recently been obliged to increase its facilities and add to its plant in Brooklyn.

Harlem Ship Canal Contract.

It is reported that Secretary Endicott has settled the controversy which has arisen in regard to the work of excavating the Harlem Ship Canal, by awarding the contract for that work to John Satterlee, of Englewood, N. J., at his bid of 93 cents per cubic yard for material above water, and \$1.13 per cubic yard for material under water. The appropriation for this work amounts to \$400,000.

Car Heating Notes.

The Sewall Car Heating Co. and the Williams system have each received an order to fit up 12 coaches for the Chicago, Burlington & Quincy.

The Ohio & Mississippi has equipped one accommodation train with continuous heating.

The Quaker Bridge Dam.

At a meeting of the Aqueduct Board, Dec. 21, the plans of the Quaker Bridge Dam and Reservoir, presented by Chief Engineer Church, were accepted, and the Chief Engineer was directed to prepare working plans with a view of putting the work under contract.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders of railroad companies will be held as follows:

Rome, Watertown & Ogdensburg, annual meeting, at the office, New York, Dec. 28.

Georgia Company, annual meeting, at the office, High Point, Guilford County, N. C., Jan. 10.

Cleveland & Pittsburgh, annual meeting, at the office, Cleveland, O., Jan. 4.

Manhattan, special meeting, at the office, New York, Jan. 10.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Bell & Gap, 5 per cent., payable Dec. 31.

Evansville & Terre Haute, quarterly, 1½ per cent., payable Jan. 17.

Northern Central, semi-annual, 4 per cent.

Worcester, Nashua & Rochester, semi-annual, \$3 per share, payable Jan. 2.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Western Society of Engineers holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The New England Railway Club meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The Boston Society of Civil Engineers holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The Western Railway Club meets in Chicago the third Wednesday in each month.

The American Society of Mechanical Engineers, eighth annual meeting, Philadelphia, Pa., Nov. 28 to Dec. 2, at the Continental Hotel.

The Engineers' Club of St. Louis meets the first and third Wednesday of each month till June.

The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The General Time Convention, semi-annual meeting, will be held in New York, April 11.

The National Association of General Baggage Agents holds its seventh annual convention at the Grand Pacific Hotel, Chicago, Jan. 20.

The National Association of General Passenger and Ticket Agents holds its annual meeting in St. Augustine, Fla., on March 20.

The Traveling Passenger Agents' Association holds its annual meeting in Jacksonville, Fla., on Jan. 10.

General Baggage Agents' Association.

The Seventh Annual Convention of the National Association of General Baggage Agents will be held in Chicago, Jan. 20, 1888, at the Grand Pacific Hotel at 2 p. m. Several important matters are to come up for discussion and action, and it is hoped that all roads whether members of the Association or not, will be represented at the meeting.

The resolutions relative to foreign express baggage, as adopted at the Denver and referred to the General Passenger Agents' Association, have been returned with the endorsement of that Association, and instructions to put same into effect. It is requested that all lines report whether they have placed same in effect and submit samples of tags, tickets, and forms used. All lines, whether members of the Association or not, are requested to furnish the information and samples. All lines are requested to send to the Secretary by Jan. 10 careful lists of foreign 'unclaimed baggage on hand 30 days or over, with good description of same. This includes transfer companies and union depots. Members are reminded of the resolution adopted at Denver that each member obtain a written statement from the Auditor of this line, stating whether he (the Auditor) does or does not report to his connections their respective amount of foreign excess baggage collections; said statement to be presented at the January meeting; also to the resolution adopted at Cincinnati, that the Secretary call on members to furnish him with a full report of all concealed losses. The Secretary of the association is Mr. J. E. Quick, Detroit, Mich.

American Society of Civil Engineers.

The regular bi-monthly meeting of the American Society of Civil Engineers was held Wednesday evening, Dec. 21, Mr. William R. Hutton, in the absence of President Worthen, in the chair.

The Secretary announced that the annual meeting of the Society would be held at the Society House, Jan. 18, 1888; that the subject of the proposed amendment of the constitution would then come up for discussion. An invitation has been extended to the members to inspect the new bridge over the Harlem Valley, now in process of construction, on the following day, Jan. 20; and also an invitation has been received from the members of the Society residing in Milwaukee, and from the Mayor of that city, to hold the next annual convention of the Society in that city.

The paper of the evening, "The Venturi Water Meter," was read by the author, Mr. Clemens Herschel, member of the Society, Hydraulic Engineer of the Holyoke Water Power Company, and the subject was discussed by Messrs. Flagg, Church, Emery, Striedinger, Croes, Brinckerhoff, North, Brush and the author.

At the next meeting of the Society, Jan. 4, 1888, Lieut. C. C. Rogers, U. S. N., will read a paper on "The Panama Canal."

PERSONAL.

—D. E. McFee, Superintendent of the International Railway, was killed at Sherbrooke, Quebec, on Dec. 15, while attempting to board a moving train.

—R. S. Miner, Superintendent of the South and North Division of the Louisville & Nashville, has announced his intention of resigning the position on Jan. 1.

—Frank Beresford, Assistant Chief Engineer of the Cincinnati, Hamilton & Dayton, died in Cincinnati on Dec. 12 of typhoid fever. He was 27 years of age.

—Perceval Lowell, formerly General Passenger Agent of the Chicago, Burlington & Quincy, died at Buenaventura, Cal., on Dec. 9, aged 37 years, having been in California for his health since a year ago last summer.

—It was stated last week in the Railroad Gazette that W. J. Spicer had resigned the position of General Manager of the Chicago & Grand Trunk. It has been since announced that Mr. Spicer has arranged to retain his present office.

ELECTIONS AND APPOINTMENTS.

Arkansas & Louisiana.—Jas. D. Vanderford has been appointed Auditor, vice H. H. Wheelers, resigned.

Austin & McGregor.—The directors of this recently incorporated Texas company are Joseph Nalle, W. H. Tobin and Walter Tips, of Austin, and others.

Baltimore & Ohio.—Third Vice-President Orland Smith will temporarily fill the office of Second Vice-President, left vacant by the resignation of Thomas M. King.

Beloit & Nebraska.—The incorporators of this Kansas company are: A. L. Williams, H. P. Dillon, Charles Munroe and G. W. Veale, of Topeka; G. A. A. Deane, of Lincoln Centre; L. J. Beat, of Beloit; F. L. Pound, of Ionia; W. D. Cook, of Salem, Kan., and J. I. Miner, of Red Cloud, Neb.

Buffalo, Rochester & Pittsburgh.—Gen. A. Anderson, Chief Engineer of the Northern Pacific, will become Vice-President of this company on Jan. 1., with headquarters at Rochester. George W. Bartlett has been appointed General Superintendent, with headquarters at Buffalo. Joseph P. Thompson has been appointed General Freight and Passenger Agent.

Canaveral & South Florida.—The incorporators of this Florida company are D. P. Wesson, Henry H. Harrison, J. T. Bernard, N. N. Penny and Robert Ranson.

Chicago & Atlantic.—Robert Simonton has been appointed Purchasing Agent, with office at Huntington, Ind., succeeding A. Judd, resigned.

Chicago, Kansas & Nebraska.—T. W. Wilson has been appointed Right of Way Purchasing Agent, office at Topeka, vice C. L. Ewing, resigned. W. M. Gorman has been appointed Chief Clerk in the passenger department at Topeka, Kan.

Chicago, Milwaukee & St. Paul.—D. C. Brady has been appointed Southern Passenger Agent, with office at Louisville, Ky.

Chicago, Rock Island & Pacific.—C. L. Ewing has been appointed Superintendent of the Southwestern division, vice G. F. Walker, resigned.

Cincinnati, Washington & Baltimore.—John F. McCarthy has been appointed District Passenger Agent in charge of business in Cincinnati and vicinity, vice D. C. Brady, resigned.

Cleveland, Columbus, Cincinnati & Indianapolis.—C. C. Morrill has been appointed Traveling Passenger Agent, with headquarters at Dallas, vice J. Z. Thomas, resigned.

Connecticut River.—At the annual meeting in Springfield, Mass., this week, the following directors were elected: N. A. Leonard, of Springfield; Oscar Edwards, of Northampton; Charles S. Sargeant, of Brookline; William R. Cone, of Hartford, Conn.; A. B. Harris, of Springfield; Frederick Billings, of Woodstock, Vt.; Augustus T. Perkins, of Barnstable; William Whiting, of Holyoke, and Frederick H. Harris, of Springfield. The board is the same as last year with the exception of Frederick H. Harris, who was elected in place of ex-Governor William B. Washburn.

East Tennessee, Virginia & Georgia and Memphis & Charleston.—C. H. Hudson has been appointed General Manager of these roads, vice E. B. Thomas.

Edwin Fitzgerald has been appointed Traffic Manager, with office at Knoxville, Tenn., vice Sol. Haas.

East Tennessee, Virginia & Georgia.—W. F. Allday has been appointed Passenger Agent, with headquarters in New Orleans.

Hartford & Connecticut Western.—The following directors were elected this week: Charles F. Hillyer, Henry A. Botsford, Jeffrey O. Phelps, William L. Gilbert, Henry Gay, Frederick Miles, William H. Barnum, Edwin W. Spear, George S. Frink, Thomas Corneli, William W. Gibbs, James W. Husted and Julius H. Appleton. It is a re-election of the old board of directors except that Edwin W. Spear takes the place of Governor Holley.

Housatonic.—The following directors were elected last week: William H. Barnum of Lime Rock, Thomas Rutter of New York, William H. Starbuck of New York, A. B. Mygatt of New Milford, William H. Stevenson of Bridgeport, Henry Hertz of Brooklyn, J. L. Macauley of New York, William E. Downs of Birmingham, Gen. S. E. Merwin of New Haven. At a subsequent meeting of the Board of Directors, officers were elected as follows: President, William H. Starbuck; Vice-President and General Manager, W. H. Stevenson; Secretary and Treasurer, C. K. Averill; Executive Committee, W. H. Stevenson, J. L. Macauley, Thomas Rutter, Henry Hertz.

Lake Shore & Michigan Southern.—Joseph O. Osgood has been appointed Chief Engineer, vice G. R. Hardy, resigned.

Louisville & Nashville.—John Y. Smith has been appointed Master Mechanic of the shops at Montgomery, Ala.

Maine Central.—The old board of directors was unanimously re-elected this week.

Manhattan Beach.—The following officers and directors were elected this week: President and Treasurer, W. G. Wheeler; Vice-President, F. W. Dunton; Secretary, Frank McDonough; Directors, J. R. Maxwell, Henry Graves, Henry W. Maxwell, William G. Wheeler, Frederick W. Dunton, Frank McDonough, William J. Kelly, Charles R. Flint, Edward B. Sprague, James K. O. Sherwood, Edwin H. Atkins, Thomas F. Ward and Gilman S. Moulton.

Milwaukee & Geneva.—The incorporators of this Wisconsin company are Edward H. Waldron, Charles A. Haslett, Louis M. Kane, Algernon S. Osgood and John Rabb.

New Lisbon, East Liverpool & Southern.—The following directors of this Ohio company were elected last week: Daniel Crawford, of St. Clair; Ezra Frost and D. J. Smith, of New Lisbon; Hon. J. Y. Williams, of Madison, and George Goodwin, C. Mettsch, W. W. Harker, John R. Wylie and George Morley, of East Liverpool. The officers elected were: Daniel Crawford, President; George Morley, Vice-President; George P. Kirt, Secretary, and N. G. Macrum, Treasurer.

New York, New Haven & Hartford.—The following directors were elected this week: George N. Miller, A. R. Van Ness, Wilson G. Hunt, E. H. Trowbridge, William D. Bishop, Nathaniel Wheeler, Henry C. Robinson, Edward M. Reed, George H. Watrous, Charles P. Clark, Joseph Park, Chauncey M. Depew, Henry F. Lee. The last named is now the only director from Massachusetts. He takes the place of C. M. Pond, of Hartford.

New York, Pennsylvania & Ohio.—S. F. Randall has been appointed Superintendent of the Western Division, with office at Galion, O., vice G. W. Bartlett, resigned.

J. S. Bannon has been appointed General Yardmaster at Youngstown, O.

Richmond & Danville.—George S. Scott has been elected President. The new board of directors consists of George S.

Scott, Harris C. Fahnestock, Calvin S. Brice, Samuel Thomas, J. G. Moore, John H. Inman, C. H. McGhee, Samuel F. Inman, George F. Stone, J. A. Rutherford, Emanuel Lehman, John S. Barber and J. C. Maher.

Richmond & West Point Terminal.—James Swann, Edward Lauterbach and J. O. Moss have been elected directors in place of William Rockefeller, Roswell P. Flower and R. T. Wilson, who had declined the offices.

St. Paul, Minneapolis & Manitoba.—T. Jefferson Coolidge, of Boston, has been elected a director.

Toledo & Michigan Belt.—The incorporators of this Ohio company are S. C. Reynolds, Fred. J. Reynolds, Abram W. Colton, Calvin Barker and Emory D. Potter. The following are the officers: President, S. C. Reynolds; Vice-President and General Manager, F. J. Reynolds; A. W. Colton, Auditor; Calvin Barker, Secretary and Treasurer; E. D. Potter, General Counsel.

Union Pacific.—J. A. S. Reed has been appointed General Traveling Agent, with headquarters in Chicago.

Wabash Western.—J. W. Guthrie has been appointed Commercial Agent, with office in Cincinnati. The offices of H. L. Magee, Superintendent, and C. H. Talmage, Resident Engineer, have been changed from Moberly to Kansas City, Mo.

Wisconsin Central.—T. J. Hyman has been appointed Auditor, vice Edward Ferguson, resigned.

OLD AND NEW ROADS.

Annisson & Cincinnati.—It is expected to have the road completed from Annisson to Attalia, Ala., on April 1.

Atchison, Topeka & Santa Fe.—Nearly two miles of track a day are being laid on the Kiowa extension across the Panhandle of Texas toward the New Mexican line. The track is now at Panhandle City, which has been selected as the end of the division.

Baltimore & Ohio.—The company has placed on record its mortgage to the Merchants Trust & Deposit Co., of Baltimore for \$29,600,000 to cover the issue of the consolidated mortgage bonds ordered under a resolution of the Board of Directors. The mortgage is to take up existing mortgages as follows: April 29, 1853, William G. Harrison, trustee, \$700,000; another of the same date to the same trustee, \$2,500,000; one to the City of Baltimore, Feb. 16, 1854, \$5,000,000; a mortgage of March 1, 1870, to John W. Garrett, Johns Hopkins and James Tinker, trustees, \$8,000,000; mortgage of May 20, 1872, to the same trustees, \$2,000,000; a mortgage of Jan. 17, 1874, to William K. Riser, T. Harrison Garrett and William F. Burns, trustees, \$2,000,000. The aggregate outstanding indebtedness secured by these mortgages is \$29,687,808. To cover this the company issues its consolidated mortgage bonds to the amount of \$29,600,000, bearing interest at such rates as may be fixed from time to time. The bonds are each for \$1,000, payable to bearer, if not registered, interest to be paid semi-annually, at the rate of five per cent., and the face in gold, at the agency of the company in New York, Feb. 1, 1888; the interest to be paid without any deduction by reason of any tax or assessment the railroad company may be required to retain or deduct by any law of the United States, Maryland, West Virginia or Ohio.

Beloit & Nebraska.—The company has filed a charter in Kansas. The proposed road is to extend from Beloit, Mitchell County, to the north line of the state in Jewell or Smith County, a distance of 60 miles. Capital stock, \$1,000,000.

Birmingham Mineral.—J. W. Worthington & Co., of Woodstock, Ala., will complete their contract to grade 7 miles of this road within 60 days.

Birmingham, Selma & New Orleans.—The line has been surveyed from Martins Station, its present terminus, 21 miles from Selma, Ala., to a point on the Tombigbee River, in a direct line to New Orleans, the ultimate point of termination.

Boston & Albany.—The Pacific express which has for several years left Boston at 7 p. m., and before that started at 6, is to be held until 9 o'clock. It will arrive in Albany at 3:40 a. m.

Burlington & Missouri River.—The Attorney General of Nebraska is preparing a petition to annul the consolidation of the Atchison & Nebraska with the above company. He claims that the Burlington was not a legal purchaser, and therefore cannot hold the franchise, which will revert to the state, and can be sold to a competing line.

California & Oregon.—The road was completed at Ashland, Ore., as anticipated, on Dec. 17.

Canadian Pacific.—The published story that the road was to be leased by the Dominion Government on a guarantee of 3 per cent., has been given an emphatic denial by General Manager Van Horne and Sir Donald Smith of the directory. It is stated that between now and the end of next year, the company will build 5,000 freight and 2,000 flat cars, and 200 locomotives.

Canaveral & South Florida.—Chartered in Florida. The company will build a road from Titusville to Canaveral, with a branch to the Banana River. Capital stock, \$400,000.

Chattanooga, Hiwassee & Augusta.—The name of the Chattanooga, Cleveland & Murphy will be changed as above. The road is intended to furnish a short route from Chattanooga, Tenn., to Augusta, Ga., about 250 miles. Surveys are now in progress and right of way is being secured. Henry A. Colton, Murphy, Tenn., is President.

Chattanooga, Rome & Columbus.—C. E. James, of Chattanooga, Tenn., has the contract for laying the rails on the first six miles of this road, and is now at work.

Chicago & Calumet.—The company has filed in Illinois the record of a resolution adopted by the stockholders authorizing the issue of \$7,000,000 of bonds, covering all personal property and franchises of the company. The loan is designed to furnish funds for the completion of the road.

Chicago & Eastern Illinois.—The road is to be extended to St. Louis next year. This year the company has built westward to Tuscola, Ill., 55 miles. It is stated that if the control of the Evansville & Terre Haute is not obtained by February or March next, the construction of a parallel road from Evansville to Terre Haute will be begun.

Chicago, Kansas & Nebraska.—The Clay Centre Extension has been completed to Phillipsburg, Kan. The Dodge City & Salina branch will be in operation within a few days. The company now has 1,110 miles of road in operation in the state of Kansas.

Chicago & New Orleans.—Articles of incorporation filed in Illinois. The road is to be built from a point near the city of Effingham, southward to a point on the north

bank of the Ohio River, in the county of Massac. Principal office, Springfield. Capital stock, \$2,000,000.

Chicago & Northwestern.—This company has had to stop all work on the northern part of the Michigan peninsula, owing to the advent of winter. Among the important lines building besides the main line from Green Bay to Ishpeming, are the Iron River and Watersmeet extension, the Felch Mountain Branch, the Cascade Branch, the Ishpeming & Michigan mine extension and the Champion & Republic extension. It is reported that the new line from Metropolitan to Republic will be built next season, and that the road to L'Anse will be built within a year, paralleling the Duluth, South Shore & Atlantic for some distance.

The company has let contracts for 3,900 freight cars.

Chicago, Rock Island & Pacific.—It is reported that the company will make Colorado Springs, instead of Denver, the terminus of its Colorado line.

It is stated that W. C. Bradbury has taken the contract for grading 125 miles of the Trinidad extension of this road. The Denver extension was completed through Salina, Kan., last week.

Chicago, St. Louis & Paducah.—The road is completed and open for business from Marion, Ill., to a connection with the Cairo, Vincennes & Chicago near New Burnside, 15 miles.

Cincinnati, Indianapolis, St. Louis & Chicago.—The company has decided to build shops at Indianapolis, giving employment to 450 men. Work will begin in the spring.

Clinch Valley.—John P. Pettyjohn, of Lynchburg, Va., has contracted to build at Bluefield, two miles from Graham, Va., a 16-stall roundhouse, machine shop 40 by 100 ft., store and oil house, 40 by 60 ft., a depot and 29 houses, at a cost of \$60,000.

Colorado Midland.—Track is completed to Glenwood Springs, Colo., 86 miles west of Leadville and 221 miles west of Colorado Springs. The Aspen Branch, 17 miles, has been completed.

Columbus Southern.—All the money necessary for building the road is said to have been obtained. Twenty-five miles of grading north of Albany, Ga., have been let to subcontractors, who will begin work immediately.

Danville & Great Western.—A bill has been introduced in the Virginia Legislature to incorporate this company for the purpose of building a road from Danville to Bristol, Tenn. Capital stock, \$100,000. J. B. Pace and others, incorporators.

Duluth, South Shore & Atlantic.—There is trouble on the Summit Division near Dogwood, Mich. The subcontractors refuse to allow the railroad company to lay rails over the graded roadbed there. Sheriff and posse have taken charge of affairs. Dispatches give no particulars.

Duluth, Wilmar & Sioux Falls.—The engineers of this extension of the Manitoba system are now surveying southwardly from Sioux Falls, Dak. The crossing of the Missouri River will probably be made at Yankton, Dak.

Eastern.—The meeting of the stockholders has again been adjourned until Dec. 29. At the meeting in Boston last week there was no result arrived at in the election of directors. Mr. Dwight Braman entered a protest during the balloting charging that certain votes which had been cast by proxy had been duplicated. It is explained in regard to this that in counting the ballots it was found that the opposition ticket had been elected over the old board. It is then asserted that friends of the latter hastened out and found certain parties, and by personal influence and arguments secured the revocation of the antagonistic proxies. Then the new proxies were cast for the old board. In counting up, the proxies of later date were the ones used, while the others were thrown out. This failed to please the opposition, and hence Mr. Braman's protest.

Evansville, Terre Haute & Indianapolis.—Articles of incorporation filed in Indiana. The proposed road will run from Sullivan to Indianapolis, a distance of 75 miles. The capital stock is \$1,000,000, of which \$986,000 has been subscribed by D. J. Mackey, of Evansville, and the remaining \$14,000 being divided between 14 others of Evansville and New York.

Fayetteville & Winston.—The road was sold last week to Capt. A. B. Andrews, of Richmond, Va., for \$8,000. As it now is the road consists of a graded roadbed of 18 miles from Greensboro, Va., franchises, etc. The purchaser is Third Vice-President of the Richmond & Danville.

Fitchburg.—No further ballasting is to be done on the Western division this winter except the completion of a considerable piece of work near Mechanicsville, N. Y. Several bridges on the Troy & Boston Division are still in hand. The bridge at Williamstown is finished and the one at Buckland soon will be. Work has begun on the rebuilding of the bridges at Hoosick Falls and Greenfield.

New York state has given the company permission to construct, at Rotterdam Junction, a basin 100 ft. by 475, a grain elevator and other facilities for transferring freight to and from the Erie Canal. This work will be begun on immediately.

Flint & Pere Marquette.—The terms of the proposed purchase of the Port Huron & Northwestern road by this company are the purchase of all the outstanding stock and bonds of the latter company by a 5 per cent. bond of the Flint & Pere Marquette. It is understood that the Flint & Pere Marquette will negotiate for an entrance into Detroit in conjunction with the Detroit, Lansing & Northern.

The company has secured right of way around Saginaw, Mich., and will soon build a road making a circuit of Saginaw and East Saginaw.

Fort Worth & Denver City.—The track is laid to a point 407 miles northwest of Fort Worth, Tex.

Grand Trunk.—It is understood that the company is negotiating with the Beaver Steamship Line to take its Portland (Me.) trade, the negotiations with the Allan Line having failed.

Gulf, Colorado & Santa Fe.—It is stated that the contract between this company and the Mailory line of steamers will expire on Jan. 1, and that it will not be renewed. It is also stated that a new contract has been closed with the Morgan line.

Helena, Boulder Valley & Butte.—This Northern Pacific branch has been extended from Boulder, Mont., to Calvin, 13 miles.

Housatonic.—At the meeting of stockholders last week a resolution was adopted instructing the directors to build a branch from the main line at Newtown, Conn., to a point in Huntington connecting with the New Haven & Derby, a distance of 10 miles, at an estimated cost of \$10,000 per mile.

Houston, Central Arkansas & Northern.—This company was organized about a year ago to build a road

from Pine Bluff, Ark., to Houston, Texas. Some surveys and estimates were made at the time, then the enterprise was put to sleep. Now it is announced that the road will be built but that Little Rock instead of Pine Bluff will be the Arkansas terminus. The length of the new road is about 300 miles. Some one has been obliging enough to publish the statement that work will begin on Feb. 1. Maj. James Converse, of Houston, Tex.; A. W. Files, Ex-Auditor, of Kansas, and C. N. Knight, Southwestern Agent of the Memphis & Charleston road, are among the charter members of the company.

Houston & Texas Central.—The plan of reorganization, a summary of which was printed in the *Railroad Gazette* last week, has been unanimously approved by the general mortgage bondholders. It is understood that no changes will be made in the adopted plan, and there will be no delay in carrying it out.

Illinois Central.—This company's line, the Cherokee & Sioux City, was completed this week into Sioux Falls, Dak.

Indianapolis, Decatur & Springfield.—The reorganization of this company was completed this week at a meeting of a majority of stockholders held in Decatur, Ill. At a subsequent meeting in Indianapolis, the Indiana and Illinois divisions were consolidated under the name of the Indianapolis, Decatur & Western. The purchasers under the reorganization are the second mortgage bondholders.

Kansas City, Fort Scott & Gulf.—General Manager Nettleton has rescinded the call for a meeting for Jan. 2 to consolidate this company with the Kansas City, Springfield & Memphis, and has published a new call for Feb. 10.

Kansas City, Memphis & Birmingham.—The branch between Amory and Aberdeen, Miss., will be put in operation on Dec. 24. It is 14 miles long.

Kansas City, Rich Hill & Southern.—The contract for building the road from Rich Hill to East Lynne, Mo., about 40 miles, has been let to H. P. Selden, of Kansas City. Work will be commenced at once.

Kansas Midland.—The company has obtained right of way from Wichita, Kan., through the Indian Territory to a connection with the St. Louis & San Francisco at Sepulpa.

Lawrence, Atchison & Southern.—At a meeting this week contracts were let for the construction of the line from Lawrence to Atchison, Kan.

Milwaukee & Geneva.—Articles of incorporation have been filed in Wisconsin by this company for the construction of a line from Milwaukee south and southwestward through the counties of Milwaukee, Waukesha, Racine and Walworth, to a point on the state line of Illinois in the town of Nalworth, where it is to connect with the proposed Peoria & Michigan, which is projected from Peoria, Ill., to Walworth. Length of road, 55 miles. Principal office, Milwaukee.

Minnesota & Dakota.—The contract for grading this road from Fargo, Dak., 125 miles due northwest to a point 15 miles west of New Rockford, in Wells County, passing through Ottawa, Sherbrooke and New Rockford, has just been let to "Mr. Job Voak," of Massachusetts. This contract is to be completed in the spring. The road is to be in operation in time to move next season's crop. E. H. Cutler is vice-president of this company.

Missouri Pacific.—Work has been stopped until spring on the extension, which has been in course of construction for the last few months between Talmage and Crete, Neb. The grading of the line is finished.

Mobile & Birmingham.—The work of tracklaying on the unfinished portion of this road is very nearly finished, and the line will be in operation between Selma and Mobile by Jan. 15.

Mobile & Northwestern.—This road, running from Glendale to Clarksville, Miss., is to be changed from narrow to standard gauge.

Nashville & Knoxville.—Coffee & Ware, of St. Louis, Mo., have contracted to build part of this road.

Natchitoches.—The road has been opened from Natchitoches to Prudhomme, La., 11 miles, connecting at the latter place with the Texas & Pacific.

New Castle & Shenango.—Work has been commenced on this road, an extension of the New York, Pennsylvania & Ohio in Western Pennsylvania.

New Jersey Southern.—The company is building a new fast steamboat to run between New York and Sandy Hook. A new depot is to be built at the latter place.

New Lisbon, East Liverpool & Southern.—This company was formally organized in Ohio last week. Right of way has been secured from New Lisbon to East Liverpool, O., and the New York, Pennsylvania & Ohio agrees to lease the line when completed.

New River & Chamber's Valley.—Chief Engineer Ingles, of the Norfolk & Western, will shortly make the survey of this road.

New Roads.—A. R. Gonzales, representing Luis Huller, and M. Fernandez, Superintendent of Public Works of Mexico, have signed a Government concession for the building of a railroad from Alamos to Guaymas, and from Aguilero and Alamos to any point on the Mexican Central.

A dispatch from Ellsworth, Kan., states that there is being organized a railroad company, composed of prominent men in towns interested, to build a railroad from Ellsworth, through Lincoln Centre, Glen Elder, Iona and Salem, to the state line of Nebraska. This will be a continuation of the Kansas Midland, which will reach Ellsworth in a few days.

It is reported that a company is being formed to build a 9-mile road up the Crooked Fork of Emory River in Tennessee to open up coal lands.

New York, Lake Erie & Western.—The company is asking bids for additional passenger equipment.

New York, Mahoning & Western.—Work has commenced at Findlay, O., on the new shops of the company. The main building will be of stone and brick, and will be 214 ft. long by 80 ft. wide. There are to be two other buildings, each 175 ft. long by 60 ft. wide, and it is expected to have all of them completed by April next.

New York, New Haven & Hartford.—At the meeting this week H. G. Goodwin offered the following resolution, which was voted down:

Resolved, That the directors be and they are hereby authorized and directed to run at least one car on every accommodation train in which passengers will be transported at a rate not exceeding one cent a mile.

Mr. Goodwin also proposed inquiries, as usual, into the action of the directors and their methods of exhibiting the financial affairs of the company, but received no support.

Omaha & Republican Valley.—The company has filed a mortgage in Nebraska for \$695,000, in favor of

the American Loan & Trust Co., of Boston. This is at the rate of \$10,000 per mile.

Orange Belt.—The road has been completed to a connection with its western section at Macon, Fla., which now makes over 100 miles in operation. Trains will soon be running into Tarpon Springs, 18 miles further. The entire line from Monroe to Point Pinellas, 148 miles, will be completed by Feb. 1.

Oregon & Pacific.—Nelson Bennett and George W. Hunt, who had a contract for building 90 miles of this road from Albany to the Summit of the Cascade Mountains, have abandoned this work. They claim that the company is four months behind in its payments.

Owensboro, Falls of Rough & Green River.—J. N. Alsop, of Owensboro, Ky., has contracted to make the survey of this road, which is projected to run from Owensboro to Falls of Rough, Ky., 35 miles.

Pennsylvania.—A cross bill has been filed in the suit of this company to foreclose the mortgage of \$10,000,000 against the Allegheny Valley. The bill recites that the Pennsylvania first threw the Allegheny Valley into the hands of receivers, became possessed of a majority of the stock, put in a board of its own, and by the construction of extensions and branches, mispent and wasted the revenues of the road and brought about its financial embarrassment. The Pennsylvania owed the state \$9,000,000 on the purchase of the public works. The bonds were in the state treasury to that amount, and were being paid at the rate of \$100,000 or \$200,000 per annum. The company proposed to the state that if it would allow the substitution of the Allegheny Valley's bonds and those of the Philadelphia & Erie and the Northern Central, the company would take this \$9,000,000 in bonds of their own which had an immediate value, and distribute them around to several railroads in the state enumerated in the bill which needed aid. This was done. The endorsed bonds were put into the treasury, and the Allegheny Valley failing to pay the interest thereon, the Pennsylvania had to do so. To cover this interest a blanket mortgage for \$10,000,000 was made by the Allegheny Valley to the Pennsylvania.

The company has authorized the extension of the privileges of the saving fund it recently inaugurated for its employees to all parts of its system. The plan will be put in effect on Jan. 1.

Pennsylvania Company.—The company desires bids for 2,000 gondola and 1,000 box cars; also for 20 consolidation locomotives. The shops of the company are crowded with other work.

Pittsburgh & Lake Erie.—The company desires bids for building 300 coal cars, 10 passenger coaches and 6 locomotives.

Several officials in the passenger department of this company received notices this week, signed by John Newell and General Superintendent Holbrook, signifying that their services would not be required for the next few days. It is thought that counterfeit tickets are in existence. Superintendent Holbrook states that no particular person is accused of defrauding the company, but that some very careless work has been done, and in order to allow a thorough investigation it has been thought best to give the Auditor and his clerks a chance to make a private examination. He says that there are some very peculiar tickets used on the road and he proposes to find out whether they come from his own clerks, from ticket brokers, or other sources.

Pittsburgh & Western.—The company is asking for bids for 1,000 freight cars.

Roanoke Railroad & Lumber Co.—The company will build a road from Reidsville to Plymouth, Va., 30 miles.

St. Louis & San Francisco.—The stockholders have authorized the proposed extension of the system in the Southwest, as decided upon at the last meeting of directors, to cover the expenses of which an issue of \$50,000,000 of bonds was agreed upon. The uncompleted lines from Pierce City, Mo., to Sapulpa, L. T., about 200 miles in length, will be completed; also the 104 miles of unfinished road from Wichita, Kan., to Ellsworth, on the Union Pacific. It is intended to run the line from Sapulpa directly west to Albuquerque, N. M., where it will meet the Atlantic & Pacific, in which the St. Louis & San Francisco is heavily interested. Another extension contemplated is the building the line from Paris, Tex., its present terminus, to Roberts, on the Texas & Pacific, 65 miles.

St. Paul & Duluth.—The work of double tracking and otherwise improving this road between Gladstone and White Bear, Minn., is now in progress, and will be finished and ready for use next summer.

San Pablo & Tulare.—The company has completed 50 miles of grading between Tracy, San Joaquin County, Cal., and a point near Hill's Ferry, Merced County, Cal.

Savannah, Dublin & Western.—This road, being built in Georgia by a number of Philadelphia capitalists, has been purchased by the Central of Georgia.

Scottsboro & Guntersville.—Chartered in Alabama by L. D. Lusk and others of Scottsboro.

Selma & Cahaba Valley.—The survey is about finished and tracklaying will begin soon. It is expected to have the road in operation between Selma and Bessemer, Ala., a distance of 65 miles, by next fall.

Spokane & Palouse.—The road is graded for its entire length from Spokane Falls, Wash. Ter., to Genesee, Idaho, 115 miles. Track is laid to a point 85 miles from Spokane Falls.

Southern Pacific.—Work was begun last week at Fresno, Cal., on the line to run from that place to a connection with the main line of the Southern Pacific at Paso. From Merced a six mile road will be built to connect with the above. A 20 mile road will also be built from Modesto to Oakdale. The line now running from Berenda to Raymond is to be extended out to the Yosemite Falls on the Merced River. The company has a road running from Tracy to a point 35 miles directly south, and grades are extending this line southward to Lake Tulare, to Bakersfield, and to Panama. The line running from Goshen to Huron, 40 miles, is also to be considerably extended.

Toledo & Michigan Belt.—Incorporated in Ohio to build a belt road west of Toledo, connecting the Wheeling & Lake Erie and the East Toledo Belt roads with the Michigan Central, Wabash, Lake Shore & Michigan Southern and Toledo, St. Louis & Kansas City lines.

Union Pacific.—The company has removed the passenger divisions from Brookville and Wallace, Kan., to Ellis, Kan., making that the only division between Kansas City and Denver, Colo.

Welch Mill & Centreville.—This company will soon be organized in Alabama. J. T. Welch, of Plantersville, Ala., is interested.

Williamsport & Binghamton.—The Williamsport & Northeastern and the Binghamton & Southwestern have been consolidated under the above title.

Wilmington, Chadbourn & Conway.—This road was opened for business this week between Chadbourn, N. C., and Conway, S. C., a distance of 39 miles. The new line connects with the Wilmington, Columbia & Augusta at Chadbourn.

Zanesville, Newcomerstown & Cleveland.—President Willis Bailey has transferred all the property in Zanesville, O., ostensibly purchased for terminal facilities for his company, to the Central Ohio, of which the Baltimore & Ohio is the lessee.

TRAFFIC AND EARNINGS

Agreement of Trunk Lines for Equalizing Rates

The trunk line presidents have adopted the following resolutions, which seem intended to give the Trunk Line Commission authority to take action concerning the maintenance of harmonious relations between the various lines, which will have the same effect as would a traffic or money pool. The resolutions say: "In the case of the diversion of west-bound traffic from any line which reduces the shipments by that line below a fair proportion, the Commissioner shall, on the complaint of the party claiming to be injured, at once investigate and determine the truth of the charge. If he fails to adjust the matter otherwise, then he shall, from time to time, make rates upon the class or article complained of, which will restore to the line a fair share of traffic. No reduction of rates shall be made by the Commissioner without due notice to the members of the association, and should any reduction be authorized as above at any commercial centre, a corresponding reduction shall, if necessary, be authorized at other commercial centres so as to maintain the present relative rates as between such points. In case of the diversion of dressed meat and live stock traffic from any line, which reduces the shipments by that line below a fair share of said traffic, the Commissioner of the Trunk Line Association and the Chairman of the Central Traffic Association shall, on complaint of the party claiming to be injured, at once investigate and determine the truth of the charge. If the Commissioners fail to adjust the matter otherwise, then they shall from time to time make the rates upon the said traffic such as will restore to the line which is behind its fair proportion, but no reduction of rates shall be made without notice to all members of the association."

Anthracite Coal Tonnage.

The anthracite coal tonnage for month of November, 1887, compared with same period last year, is reported as follows, by John H. Jones, the Official Accountant, the statement including the entire production of anthracite coal, excepting that consumed by employees and for steam and heating purposes about the mines:

	1887.	1886.	Difference.
Phila. & Reading	788,608	748,734	D. 39,874
Central of N. J.	427,473	408,142	D. 19,331
Lehigh Valley	397,526	327,333	D. 70,193
Del., Lack. & West.	717,542	529,109	D. 188,432
Del. & Hud. Canal Co.	444,586	340,844	D. 103,742
Pennsylvania	3,658	312,204	D. 318,546
Pennsylvania Coal Co.	177,575	146,526	D. 31,049
N. Y., L. E. & W.	60,552	65,742	D. 5,190
Total	3,386,190	3,277,636	D. 108,554
For year	1887.	1886.	Difference.
Phila. & Reading	6,936,947	6,151,056	D. 785,890
Central of N. J.	4,470,412	4,536,397	D. 65,984
Lehigh Valley	5,427,804	5,587,537	D. 159,733
Del., Lack. & West.	5,495,108	4,694,389	D. 800,718
Del. & Hud. Canal Co.	3,330,529	3,216,854	D. 113,675
Pennsylvania	3,454,830	3,190,325	D. 264,505
Pennsylvania Coal Co.	1,451,732	1,287,204	D. 164,528
N. Y., L. E. & W.	685,487	681,250	D. 4,237
Total	31,572,939	29,323,012	D. 2,249,926

The stock of coal on hand at tidewater shipping points, Nov. 30, 1887, was 112,103 tons; on Oct. 31, 1887, 158,976 tons; decrease, 46,873 tons.

Coal.

The coal shipments for the week ending Dec. 17 are reported as follows:

	1887.	1886.	Increase.	P. c.
Anthracite	756,908	667,176	I. 89,732	13.4
Bituminous	405,314	271,127	I. 134,187	49.5

The coal tonnages of the Pennsylvania road for the week ending Dec. 10 are reported as follows:

	Coal.	Coke.	Total.
Line of road	236,996	92,016	329,012
Year to Dec. 10	9,724,693	3,488,186	13,212,879
To Dec. 11, 1886	8,186,793	3,338,368	11,525,161

The coal tonnage of the Pennsylvania road for the week ending Dec. 17 is reported as follows:

	Coal.	Coke.	Total.
Line of road	246,313	94,167	340,480
Year to date	9,970,006	3,582,293	13,552,299
Year 1886 to date	8,390,344	3,417,597	11,807,941

Cumberland coal shipments for the week ending Dec. 17 amounted to 72,712 tons, and for the year to Dec. 17 3,216,543 tons.

Cotton.

The cotton movement for the week ending Dec. 16 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Interior markets	153,717	168,234	D. 14,517	9.8
Receipts	159,766	169,366	D. 9,600	23.0
Shipments	122,671	159,366	D. 36,695	21.0
Stock	407,361	410,935	I. 3,574	21.0
Seaports				
Receipts	213,902	260,659	D. 46,757	47.9
Exports	165,270	198,910	D. 33,640	16.9
Stock	890,725	1,043,302	D. 152,577	5.0

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of November:					
	1887.	1886.	Inc. or Dec.	P. c.	
Atch. T. & S. Fe.	1,646,310	1,715,554	D.	69,244	4.0
Cap. F. & Y. V.	36,959	21,408	I.	15,551	26.9
Chi. & Ohio R.	8,160	7,131	D.	1,971	27.7
C. L. St. L. & C.	242,173	247,753	D.	5,580	2.2
Cin. J. & Mack.	39,749	37,130	I.	2,619	6.2
Den. & R. G. W.	112,850	92,850	I.	20,000	21.5
Gulf, C. & S. Fe.	387,200	280,313	I.	106,887	38.1
K. C., Cl. & Spr.	22,558	21,992	I.	566	2.6
Keok. & West.	29,110	29,693	D.	583	1.9
L. Rk. & M.	104,444	107,636	D.	3,192	2.3
Mex. N. (All lines) ..	155,838	144,022	I.	11,816	8.1
Miss. & Tenn.	66,328	60,069	I.	6,259	10.3
Nash. C. & St. L.	259,625	213,767	I.	45,858	21.4
Ohio Southern.	60,153	59,983	I.	170	0.2
San A. & Aran. P.	76,159	23,184	I.	52,975	227.3
Total.....	3,234,372	3,061,838	I.	172,534	5.6
			D.	79,893	2.6
Net.....				172,534	5.6

Month of October:			
Atch., T. & S. F.	1,674,161	1,687,348	D. 13,187
Net	860,080	1,619,570	D. 153,490
Cairo, V. & Chic.	74,540	62,024	I. 12,516
Net	28,778	11,012	I. 17,766
Cape F. & V. Vy.	29,128	24,331	I. 4,797
Net	15,474	13,864	I. 1,610
Can. of Georgia	865,121	802,030	I. 63,101
Net	482,546	441,523	I. 41,023
Chi., Bur. & No.	192,887		
Net	52,071		
Chi. Mil. & St. P.	2,800,089	2,798,077	I. 2,012
Net	1,379,486	1,439,443	D. 59,957
Keok. & W.	31,555	29,876	I. 1,679
Net	10,120	5,419	I. 4,701
Minn. & St. L.	140,017	150,911	D. 4,894
Net	64,362	64,872	D. 510
Oregon Imp. Co.	431,819	303,893	I. 127,926
Net	160,137	80,966	I. 79,172
San. A. & Aran. P.	23,416		
Net	75,892	65,047	I. 10,845
Scot. Valley	24,543	8,164	I. 16,379
South. Pac. Co.			
At. Sys.	1,129,611	775,106	I. 354,505
Net	481,539	174,562	I. 307,177
Pacific Sys.	2,609,830	2,200,706	I. 409,124
Net	1,218,633	1,093,708	I. 124,925
Total So. Pac. Co.	3,729,432	2,998,883	I. 730,549
Net	1,760,172	1,268,070	I. 492,102
Tol. & O. Cent.	110,071	87,512	I. 22,559
Net	42,500	36,358	I. 6,142
Texas & Pacific	728,363	651,992	I. 76,371
Net	295,823		
Total (gross)	10,038,340	8,987,951	I. 1,050,389
Total (net)	4,780,198	4,395,366	I. 384,832

Net. I. 384,832

Eleven months—Jan. 1 to Nov. 30:

1887.			
1886.			
Inc. or Dec.			
P. c.			
A. T. & St. F.	16,951,645	14,455,577	I. 2,496,068
Atlantic & Pac.	2,397,437	1,414,417	I. 983,020
Buff. N. Y. & P.	2,576,279	2,375,917	I. 200,362
Buff. R. & Pitts.	1,815,602	1,307,694	I. 507,908
Burr. C. R. & No.	2,700,220	2,613,540	I. 86,680
Cairo, V. & Chic.	694,801	595,546	I. 99,255
California South.	1,322,700	650,290	I. 672,410
Cape F. & V. Vy.	29,128	24,331	I. 4,797
Canadian Pac.	10,435,435	9,187,702	I. 1,247,733
Central of Ga.	5,089,298	5,231,036	I. 458,562
Central of Iowa	1,219,874	1,196,888	I. 22,986
Chas. & Ohio	4,100,274	3,755,867	I. 344,407
Eliz. Lex. & B.S.	993,587	806,684	I. 186,903
Ches. O. & S. W.	1,795,182	1,546,430	I. 248,752
Chi. & Atlantic	2,001,364	1,491,362	I. 510,002
Chi. & East. Ind.	1,874,008	1,615,173	I. 258,835
Chi. Mil. & St. P.	2,800,089	2,798,077	I. 2,012
Chi. & Ohio R.	62,128	64,231	D. 2,103
Chi. & W. Mich.	1,304,382	1,287,332	I. 17,050
C. I. St. L. & C.	2,444,135	2,354,586	I. 89,549
Cin. J. & Mack.	442,092	370,617	I. 65,175
Cin. N. O. & T. P.	3,079,435	2,611,067	I. 468,368
Ala. Gt. South.	1,417,273	1,007,072	I. 331,599
N. Ori. & N. E.	628,146	578,612	I. 49,534
Vicks. & Mer.	494,340	456,889	I. 37,450
V. Shre. & P.	536,449	445,663	I. 90,786
Total C. N. O. & T. P.	6,155,670	5,177,903	I. 977,767
Cin. R. & Ft. W.	379,270	348,839	I. 30,431
Cin. & Springfield	1,082,191	1,028,202	I. 53,989
Cin. W. & Balt.	2,018,312	1,826,777	I. 191,535
Cleve. Ak. & C.	514,372	495,536	I. 18,836
C. C. & C. I.	4,171,954	3,783,496	I. 388,458
Cleve. & Marietta	280,551	250,828	I. 29,723
Col. & Cin. Mid.	302,605	290,505	I. 12,100
Col. H. Vy. & Tol.	2,481,982	2,079,261	I. 402,722
Denver & R. G'd.	7,260,791	6,104,864	I. 1,155,927
Ev. & Terre H.	214,910	179,611	I. 35,299
Flint & Pere Mar.	2,357,204	1,667,204	I. 690,000
F. R. V. & Nav. Co.	915,980	846,732	I. 69,248
Ft. W. & Den. C.	641,362	399,230	I. 242,132
Georgia Pacific	1,110,890	748,016	I. 362,874
Grand Rap. & I.	2,180,515	1,894,829	I. 285,686
Ill. Cent. (Ill. Div.)	6,080,421	5,081,555	I. 708,866
(So. Div.)	3,774,621	3,581,911	I. 192,710
Ind. B. & W.	2,408,721	2,332,837	I. 75,884
Ind. Dec. & Spr.	381,004	381,004	I. 0
Keok. & W.	294,362	279,959	I. 14,403
Lit. R. & Mem.	709,117	676,513	I. 32,604
Lake Erie & W.	1,883,953	1,584,277	I. 299,676
Lehigh & H.	213,274	198,035	I. 15,239
Long Island	2,028,272	2,810,403	I. 217,869
L. E. & St. L.	907,892	772,969	I. 134,923
Louis. & Nashv.	14,577,358	12,609,829	I. 1,967,529
L. N. & A. & Sp.	2,070,285	1,709,785	I. 360,499
L. N. O. & T.	1,905,327	1,508,354	I. 396,973
Marq. & Ont.	1,013,577	951,279	I. 62,298
Mexican Central	4,337,255	3,416,726	I. 920,529
Mil. L. S. & W.	2,985,394	2,150,577	I. 834,817
Mil. & Northern	886,275	589,690	I. 296,586
Minn. & N. W.	1,355,062	402,554	I. 892,452
Miss. & Tenn.	439,732	382,450	I. 57,282
Mobile & Ohio	2,243,050	1,927,435	I. 315,615
Nash. C. & St. L.	2,780,435	2,170,826	I. 609,609
N. Y. C. & H. R.	33,067,003	29,705,953	I. 3,361,050
N. Y. Ont. & W.	1,431,938	1,239,829	I. 192,109
Norfolk & West.	2,827,189	2,969,071	I. 858,118
Northern Pacific	12,634,856	11,439,886	I. 1,204,970
Ohio & Miss.	3,786,020	3,530,913	I. 255,107
*Ohio River	286,745	173,124	I. 113,621
Ohio Southern	532,771	479,918	I. 52,853
Oregon R. & N. Co.	4,819,839	4,941,810	D. 121,971
Peoria, Dec. & E.	781,363	736,791	I. 44,572
Pitts. & West	1,858,498	1,429,944	I. 428,554
Rich. & Dan.	4,073,600	3,720,977	I. 352,623
Va. Mid. Div.	1,491,883	1,430,864	I. 61,019
Char. C. & A.	765,175	716,139	I. 49,036
Col. & Gr. Div.	487,490	555,431	D. 67,941
West. N. C. Div.	638,050	493,800	I. 144,250
*St. L., A. & T. H.			
Main line	1,989,524	1,706,614	I. 282,910
Branches	864,636	715,389	I. 149,247
St. L., Ark. & T.	2,392,357	1,581,892	I. 810,465
St. L. & San F.	5,614,227	4,370,586	I. 1,243,641
St. P. & Duluth	1,549,791	1,442,434	I. 107,357
St. P. M. & Man.	7,839,063	6,727,178	I. 1,111,885
Shenandoah Val.	827,821	686,330	I. 141,492
St. I. Rap. Tran.	802,068	743,776	I. 58,290
Texas & Pacific	5,514,047	5,334,432	I. 180,215
Tol. A. A. & N. M.	480,576	335,366	I. 145,210
Tol. & Ohio Cent.	972,895	744,927	I. 227,968
Tol. P. & West.	182,133	793,528	I. 78,095
Wabash West	5,916,538	5,090,489	I. 916,049
Wheeling & L. E.	674,614	532,879	I. 141,735
Wisconsin Cent.	1,946,391	1,411,135	I. 535,256
N. St. C. & W.	469,347	395,290	I. 74,057
*Wis. & Minn.	271,042	175,497	I. 95,545
Total	281,699,739	246,045,350	I. 135,654,389
Net			I. 135,654,389

* Three weeks only of November in each year.
 † Mexican Currency.
 ‡ Including Ind. & St. L.
 § Not including Chic., Wis. & Minn.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Inter-state Commerce Commission.

On Dec. 16 the case of Martin and Martin, of Denver, Col., alleging violation of the fourth section on the part of the Southern Pacific and Union Pacific, was heard. The

charge was concerning the transportation of dried fruit from San Francisco to Denver, on which the rate is \$2.30, while to Omaha it is but \$1.05.

On Dec. 16 the case of William H. Heard, a colored minister, of Charleston, S. C., against the Georgia Railroad, was heard. The complainant was compelled, on June 18, to ride in a car of inferior accommodations, although he held a first-class ticket. Counsel for the road said that the road aimed to give all persons holding first-class tickets equal accommodations, but race prejudice demanded that the white and colored passengers should have separate cars. The company was ready, however, to comply with any matters of amendment in the way of regulations that might be suggested by the Commissioners. The Commission took the case under advisement.

East-bound Shipments.

The shipments of flour, grain and provisions from Chicago eastward to seaboard points amounted last week to 68,605 tons, against 62,926 tons for the week previous. The percentages carried by the various roads were as follows: Wabash, 5.7; Cincinnati, Indianapolis, St. Louis & Chicago, 8.4; Michigan Central, 18; Lake Shore & Michigan Southern, 15.5; Pittsburgh, Fort Wayne & Chicago, 11.7; Chicago, St. Louis & Pittsburgh, 8; Baltimore & Ohio, 4.9; Chicago & Grand Trunk, 10.4; New York, Chicago & St. Louis, 6.9; Chicago & Atlantic, 10.5.

Advance in Seaboard Rates.

The Central Traffic Association has voted to advance rates on all classes of freight from Chicago and Western points to the seaboard 10 per cent. on Jan. 2. The freight movement from Chicago eastward for the last two weeks has been heavy in all departments.

Commissioner Fink's announcement of the advance in rates mentions only the 4th, 5th and 6th classes.

Illinois Local Rates.

The reduction in local rates between stations in Illinois on the Chicago & Northwestern, Chicago, Milwaukee & St. Paul, Chicago, Rock Island & Pacific, Chicago, Burlington & Quincy and Wabash, which have been much discussed for several weeks, appear to have gone into effect on Dec. 20, though the press dispatches are so vague that just how much of the threatened action has really taken place is hard to determine. It will be remembered that the Wabash reduced its local rates on the plea that they were too high to be consistent with the rates it was charging on inter-state traffic from eastern points, and that this action of the Wabash is understood to be the reason for the reduction on the other roads. Most or all the roads appear to have also reduced rates from Chicago to the Missouri River and to interior Iowa points. This is said to have been done in retaliation for the action of the Wabash. The rates from Chicago to Missouri River points are 75, 60, 40, 30, 25, 20, 17½, 16, as against former rates of 90, 75, 50, 35, 31, 32½, 29½, 23, 20, 16. The Chicago, Milwaukee & St. Paul announces that, in view of the general reduction in freight rates throughout the territory between Chicago and the Missouri River, the special reduction of 25 per cent. on grain from Council Bluffs to Chicago, which it had announced as to go into effect Dec. 20, will not be made.

Minnesota Local Passenger Rates.

The reduction of local passenger fares on the Northern Pacific and the St. Paul, Minnesota & Manitoba roads to a maximum of 3 cents per mile which was ordered by the Minnesota Railroad Commissioners is still the subject of considerable controversy. The District Court of Ramsey County has ordered a stay of proceedings, so far as the Manitoba road is concerned, until Dec. 19. The Commissioners have issued a circular, recounting the facts and giving advice to passengers as to what course they should pursue in case the Northern Pacific ignores the order; they say: "should more than the rate prescribed be exacted the Commissioners suggest that any passenger desiring to avail himself of the reduced rates should tender the exact amount of fare to the agent and demand a ticket before entering the cars. If the ticket should not be furnished, then that the passenger enter upon his journey without a ticket, tendering to the conductor the same amount offered the agent, and informing him why he has no ticket. Should the conductor insist upon a higher fare the passenger can then make his election of paying (under protest) the sum demanded, reserving the right to prosecute the company for violation of the railroad law, or of standing upon his legal rights at the risk of being ejected from the car. If ejected, the passenger might, the Commission believe, pursue his common law remedy in the courts of damages for the trespass upon his person, or institute proceedings for a violation of the railroad act, or both. The Commission hopes to be informed of every case of violation of the order. The facts of each case should be fully stated in writing and verified by oath of the passenger, or some witness to the transaction."

Traffic Notes.

The officers of the American Ticket Brokers' Association have notified the members that a bill is to be introduced in Congress prohibiting the sale of railroad tickets by any person not a duly authorized agent of the company issuing it.

A St. Paul dispatch states that a large packing house in that city is obliged to discontinue the packing of hogs because the rates from interior points in Minnesota are much cheaper, in proportion, to Chicago than to St. Paul, thus giving Chicago packers a decided advantage.

The Minnesota Railroad Commissioners have requested the roads to reduce freight rates on agricultural implements in less than car loads. The Commission seems to assume that the car-load rates are reasonable for any quantity, and that dealers in small towns should have the advantage of them on small shipments.

It is stated that the differential allowed the Grand Trunk on dressed beef and hogs from Chicago to Boston, under the agreement made by the trunk line presidents and the Central Traffic Association, a week ago is to be 3 cents per 100 lbs.

A Chicago dispatch states that the increase in price of round-trip excursion rates between Missouri River points and the Pacific coast from \$60 to \$80, which has been announced to go into effect Jan. 1, is likely to be postponed. It was agreed that the Missouri Pacific should use the old rates for two excursions; this is expected to demoralize rates on all the lines to such an extent that the higher rates cannot be maintained.

The rates from Chicago to the St. Paul winter carnival will, it is said, be one fair for the round trip.

ANNUAL REPORTS.

New York Central & Hudson River.

This company reports for the fiscal year ending Sept. 30, 1887.

The mileage operated was:

	Owned.	Leased.	Total.
Miles of road	750	697	1,447
Miles of single track	2,426	1,297	3,723

The equipment included 856 locomotives, 979 passenger,

baggage, etc., cars; 33,266 freight and service cars of all classes. Of the latter 2,194 were 4-wheel. The floating equipment was 86 boats of all kinds.

The general balance sheet, condensed, was as follows:

Assets:	
Coast of road and equipment	\$147,047,973
Stock and bonds of other companies	3,448,571
Ownership in other lines real estate, etc.	6,928,801
Due by agents and others	2,836,531
Supplies on hand	1,892,653
Cash on hand	2,534,766
Harlem construction account	37,517
Equipment Harlem line	404,394
West Shore construction account	128,715
	\$164,959,954
Liabilities:	
Capital stock	\$89,428,300
Funded debt	56,424,333
Bonds and mortgages on real estate	107,000
Fast due bonds	8,265
Accrued interest and rentals	2,049,681
Uncollected interest	8,069
Uncollected dividends	31,129
Dividend payable Oct. 15, 1887	894,283
Due for wages, supplies, etc.	2,298,116
Due other roads, etc.	1,324,557
Profit and loss (excess assets over liabilities)	12,385,090
	\$164,959,954

The earnings for the year were as follows:

Freight.....	\$21,143,099	\$18,476,532	I.	\$2,666,567	14.4
Passenger.....	10,510,472	8,786,124	I.	1,724,348	19.7
Rents.....	1,613,647	1,217,564	I.	396,083	32.5
Mail.....	782,643	778,960	I.	3,683	0.4
Telegraph.....	7,412	7,167	I.	245	3.4
Interest.....	503,078	471,949	I.	31,129	6.5
Use of road (N. Y., N. H. & H.).....	325,049	327,828	D.	2,779	8.4
Miscellaneous.....	411,655	440,217	D.	28,562	6.4
Total.....	\$35,297,055	\$30,506,361	I.	\$4,790,694	15.7
Oper. exps.....	22,368,673	18,610,377	I.	3,778,296	20.3
Net earn.....	\$12,928,382	\$11,895,984	I.	\$1,032,398	8.5
Gross earn. p. mile.....	24.393	21.082	I.	3.311	15.7
Net " ".....	8.920	8.221	I.	.699	8.5
P. c. exps.....	63.4	61.0	I.	2.4	3.8